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CORNELL

2001-2002

COURSES

of Study

Cornell University Calendar

Fall Semester	2001-02	2002-03
Residence halls open	Friday, August 24	Friday, August 23
Freshman orientation begins	Friday, August 24	Friday, August 23
New-student orientation begins	Friday, August 24	Friday, August 23
Registration–course exchange	Tuesday–Wednesday, August 28–29	Tuesday–Wednesday, August 27–28
Instruction begins	Thursday, August 30	Thursday, August 29
Physical education classes begin	TBA	TBA
Fall break: instruction suspended	Saturday, October 6	Saturday, October 12
Instruction resumes	Wednesday, October 10	Wednesday, October 16
Pre-course enrollment for spring	TBA	TBA
Family Weekend	Friday–Sunday, November 2–4	Friday–Sunday, October 25–27
Homecoming	Saturday, September 28	Saturday, October 26
Thanksgiving recess: instruction suspended, 1:10 p.m.	Wednesday, November 21	Wednesday, November 27
Instruction resumes	Monday, November 26	Monday, December 2
Instruction ends	Saturday, December 8	Saturday, December 7
Study period	Sunday–Wednesday, December 9–12	Sunday–Wednesday, December 8–11
Final examinations begin	Thursday, December 13	Thursday, December 12
Final examinations end	Friday, December 21	Friday, December 20
Residence halls close	Saturday, December 22	Saturday, December 21
Winter Session Period Begins	Wednesday, December 26	Thursday, December 26
Three-week classes begin	Wednesday, January 2	Thursday, January 2
Winter session period ends	Saturday, January 19	Saturday, January 18
Spring Semester		
Residence halls open	Monday, January 14	Monday, January 13
Registration–course exchange	Thursday–Friday, January 17–18	Thursday–Friday, January 16–17
Instruction begins	Monday, January 21	Monday, January 20
Physical education classes begin	TBA	TBA
Spring break: instruction suspended	Saturday, March 16	Saturday, March 15
Instruction resumes	Monday, March 25	Monday, March 24
Pre-course enrollment for fall	TBA	TBA
Instruction ends	Saturday, May 4	Saturday, May 3
Study period	Sunday–Wednesday, May 5–8	Sunday–Wednesday, May 4–7
Final examinations begin	Thursday, May 9	Thursday, May 8
Final examinations end	Friday, May 17	Friday, May 16
Residence halls close (students who are graduating may stay through Commencement Day)	Saturday, May 18	Saturday, May 17
Senior Week	Sunday–Saturday, May 19–25	Sunday–Saturday, May 18–24
Commencement	Sunday, May 26	Sunday, May 25
Summer Session		
Three-week session	Wednesday, May 29	Wednesday, May 28
Eight-week session	Monday, June 10	Monday, June 9
Six-week session	Monday, June 24	Monday, June 23

The dates shown in this calendar are subject to change at any time by official action of Cornell University.

In this calendar, the university has scheduled classes, laboratories, and examinations on religious holidays. It is the intent of the university that students who miss those activities because of religious observances be given adequate opportunity to make up the missed work.

The Law School and College of Veterinary Medicine calendars differ in a number of ways from the university calendar. Please consult the catalogs of those colleges for details.

The courses and curricula described in this catalog, and the teaching personnel listed herein, are subject to change at any time by official action of Cornell University.

The rules and regulations stated in this catalog are for information only and in no way constitute a contract between the student and Cornell University. The university reserves the right to change any regulation or requirement at any time.

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Courses of Study

2001 – 2002

Cornell

(USPS 132-860)

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Abbreviations and symbols used in this catalog:

M Monday	S-U Satisfactory-Unsatisfactory
T Tuesday	disc discussion
W Wednesday	lab laboratory
R Thursday	lec lecture
F Friday	rec recitation
S Saturday	sec section
	TBA to be announced
	@ geographic breadth
	# historical breadth

Courses with names and descriptions enclosed in brackets—[ ]—are not offered fall 2001 and spring 2002.

CORNELL UNIVERSITY—GENERAL INFORMATION

INTRODUCTION

Courses of study (cuinfo.cornell.edu/Academic/Courses/), a catalogue of Cornell University's many academic programs and resources, contains information about colleges and departments, interdisciplinary programs, undergraduate and graduate course offerings, and procedures. Additionally, a student handbook, distributed to all incoming students, describes life at Cornell. *The Policy Notebook* (www.univco.cornell.edu/policy/library.html), also distributed to each new student, summarizes pertinent university policies, including the campus Code of Conduct and the Code of Academic Integrity. Students should consult with their college's advising office for specific information on their college's academic policies and procedures, degree programs, and requirements.

All these publications are also available for viewing on CUINFO the university's electronic information system, and in print at the various university libraries, the Office of the Dean of the University Faculty, the Office of University Counsel, the Office of the Judicial Administrator, and the college offices.

Not included in this publication is information concerning the Medical College and the Graduate School of Medical Sciences, located in New York City.

The following are offices and sources of information about admission to Cornell University.

Undergraduate Admissions Office, 410 Thurston Avenue, Ithaca, NY 14850–2488, 607–255–5241.

Graduate School, B2 Caldwell Hall, Ithaca, NY 14853–2602, 607–255–4884.

Law School, Myron Taylor Hall, Ithaca, NY 14853–4901, 607–255–5141.

Samuel Curtis Johnson Graduate School of Management, Office of Admissions, Sage Hall, Ithaca, NY 14853–4201, 607–255–4526.

College of Veterinary Medicine, Admissions Office, Cornell University, Schurman Hall, Ithaca, NY 14853–6401, 607–253–7000.

Medical College and Graduate School of Medical Sciences. Office of Admissions, 1300 York Avenue, New York, NY 10021, 212–746–1067.

CUINFO ON THE WEB

It is not possible to keep this single-volume course list completely up-to-date. The most current information regarding course schedules, sections, rooms, credits, and registration procedures may be found on CUINFO, Cornell's electronic information source, and in the *Course and Time Roster* and the *Course and Room Roster*, published each semester by the Office of the University Registrar. You may access CUINFO through the web. The URL is: www.cornell.edu. Students are also advised to consult individual college and department offices for up-to-date course information.

EXPLANATION OF COURSE NUMBERING SYSTEMS

The course levels have been assigned as follows:

100-level course—introductory course, no prerequisites, open to all qualified students

200-level course—lower-division course, open to freshmen and sophomores, may have prerequisites

300-level course—upper-division course, open to juniors and seniors, prerequisites

400-level course—upper-division course, open to seniors and graduate students, 200- and 300-level course prerequisites or equivalent

500-level course—professional level (e.g., management, law, veterinary medicine)

600-level course—graduate-level course, open to upper-division students

700-level course—graduate-level course

800-level course—master's level, thesis, research

900-level course—doctoral level, thesis, research

The list of courses that follows is arranged in two broad groups.

Group 1: Divisions that offer both undergraduate- and graduate-level courses

Agriculture and Life Sciences

Architecture, Art, and Planning

Arts and Sciences

Engineering

Hotel Administration

Human Ecology

Industrial and Labor Relations

Nutritional Sciences

Officer Education

Group 2: Graduate professional divisions

Law

Management

Veterinary Medicine

There are no courses offered by the Graduate School as a unit; graduate-level courses are contained in the various departments that offer the instruction.

Within each division, courses are generally arranged in alphabetical order by department and in numerical order within the departments. All courses, 0–999 are briefly described for those divisions (group 1) offering instruction to both undergraduate and graduate students. Courses in the graduate professional divisions (group 2) are designated by number and title only.

ACCREDITATION

Cornell University is accredited by the Middle States Association of Colleges and Schools. A copy of the most recent reaffirmation of Cornell's accreditation can be found at www.ipr.cornell.edu/Accreditation/Status. Requests to review additional documentation supporting Cornell's accreditation should be addressed to Michael Matier, Director, Institutional Research and Planning, Cornell University, 440 Day Hall, Ithaca, NY 14853–2801, mwm5@cornell.edu.

Advanced Placement

CREDIT FOR ADVANCED PLACEMENT

Definition and Purpose of Advanced Placement Credit

Advanced placement credit is college credit that students earn before they matriculate as freshmen. Students may use credit they receive for advanced placement to satisfy degree requirements only as specified by the individual college at Cornell. Although such credit counts toward the bachelor's degree, its primary purpose is to exempt students from introductory courses and to place them in advanced courses. Its value is that it allows students to include more advanced courses in their undergraduate curricula.

Sources of Advanced Placement Credit

Advanced placement credit may be earned from the following:

a. Achieving the requisite score from the Advanced Placement Examinations (AP exams) from the College Entrance Examination Board (CEEB) in Princeton, NJ. The requisite scores, which vary by subject, are determined by the relevant departments at Cornell and are listed on pages 6 and 7.

b. Some departments at Cornell offer departmental exams (usually during orientation), for placement and advanced placement credit.

c. Passing a regular course taught at an accredited college to college students and approved by the relevant department at Cornell. Some departments have delegated the review of courses to college staff according to guidelines they have formulated. Some departments review each request individually. Some departments accept credit from virtually all accredited colleges; some do not.

d. See below for international credentials.

Please note: *Cornell University does not accept credit for courses sponsored by colleges but taught in high schools to high school students, even if the college provides a transcript of such work.* Students who have taken such courses may, however, earn credit by taking an appropriate exam as described in paragraph *a* or *b* above.

Summary of Credit and Placement

Subject	*Score*	*Advanced Placement Credit*	*Placement*
Arabic	Department of Near Eastern Studies determines credit and placement based on departmental examination.		
Biology	5 (majors)	up to 8 credits	Placement out of all introductory courses.
	4 (majors)	4 credits	4 AP credits awarded after completion of any combination of 4 credits from 101–104 or 105 or 106. Consult Office of Undergraduate Biology to determine which semester to take to complete introductory biology.
	5 (nonmajors)	8 credits	Placement out of all introductory courses.
	4 (nonmajors)	6 credits	Placement out of 109–110. Does not always satisfy the prerequisite for second- and third-level courses in biology.
Chemistry	5	4 credits	Department determines placement on basis of exam during fall orientation. No advanced placement credit for students who take 206, 207, or 211; students who take 215 will also receive 4 AP credits.
Computer science	4,5	4 credits	Placement out of COM S. 100. Department also offers placement exam during fall orientation.
Economics, micro	4,5	3 credits	Placement out of ECON 101.
Economics, macro	4,5	3 credits	Placement out of ECON 102.
English literature and composition (*all students*)	5	3 credits	Placement out of one First-year Writing Seminar.
English language and composition (*all except A&S*)	4	3 credits	A&S students with 5 on both English Language and Literature exams receive 3 credits total and place out of one First-Year Writing Seminar.
Environmental Science	4,5	3 credits	Placement out of GEOL 111 and EAS 111.
French language	4,5	3 credits	Department of Romance Studies determines placement. Students take and may earn additional credit by taking the CASE.†
French literature	4,5	3 credits (and proficiency)	Department of Romance Studies determines placement. Students take and may earn additional credit by taking the CASE.†
German	4,5	3 credits (and proficiency)	Department of German Studies determines placement. Students take and may earn additional credit by taking the CASE.†
Government and politics, U.S.	4,5	3 credits	Placement out of GOVT 111.
Government and politics, comparative	4,5	3 credits	Placement out of GOVT 131.
Greek, Ancient and Modern	Department of Classics determines credit and placement based on departmental examination.		
Hebrew	Department of Near Eastern Studies determines credit and placement based on departmental examination.		
American history	4,5	4 credits	Students strongly urged to go into advanced courses.
European history	4,5	4 credits	Students strongly urged to go into advanced courses.
History of art	4,5	3 credits	
Italian language	4,5	3 credits	Department of Romance Studies determines placement. Students take and may earn additional credit by taking the CASE.†

Subject	*Score*	*Advanced Placement Credit*	*Placement*
Italian literature	4,5	3 credits (and proficiency)	Department of Romance Studies determines placement. Students take and may earn additional credit by taking the CASE.†
Latin	Department of Classics determines credit and placement based on departmental examination.		
Mathematics BC *(excluding engineering or ABEN students; see following page for further information)*	4,5	8 credits	Placement out of MATH 106, 111–112 and 121–122, and permission to take MATH 221, 223, or 213. Students wishing to take engineering calculus may place out of MATH 190 and 191 (4 credits) and into MATH 192. Placement out of MATH 192 and into MATH 293 is available to students who can demonstrate a mastery of introductory multivariable calculus.
	3	4 credits	Placement out of all 1st-semester calculus courses (MATH 106, 111, 121, 190, 191). Permission to take any 2nd-semester calculus course (MATH 112, 122, or 192).
Mathematics AB or AB subscore of BC exam *(excluding engineering or ABEN students; see following page for further information)*	3,4,5	4 credits	Placement out of all 1st-semester calculus courses (MATH 106, 111, 121, 190, 191). Permission to take any 2nd-semester calculus course (MATH 112, 122, or 192).
Music	Department determines credit and placement based on departmental examination.		
Physics B	5	8 credits	Placement out of PHYS 101–102. Students who also have a score of 4 or 5 on Mathematics BC may choose to accept 4 AP credits for 207 or 212 and take 208 or 213.
	4	8 credits	Placement out of PHYS 101–102.
	3	4 credits	Placement out of PHYS 101.
Physics C–Mechanics	4,5	4 credits	Placement out of PHYS 112 or 207, or placement into PHYS 116 with no AP credit. For more information, contact department representative.
Physics C–Electricity/ Magnetism	5	4 credits	Placement out of PHYS 213.
Psychology	4,5	3 credits	Placement out of PSYCH 101.
Spanish language	4,5	3 credits	Department of Romance Studies determines placement. Students take and may earn additional credit by taking the CASE.†
Spanish literature	4,5	3 credits (and proficiency)	Department of Romance Studies determines placement. Students take and may earn additional credit by taking the CASE.†
Statistics *(excluding engineering students)*	4,5	3 credits	Placement out of BIOM 200, ILRST 210 or MATH 171.

†Cornell Advanced Standing Examination. Contact Callean Hile, 303 Morrill Hall, for French, Italian, and Spanish. Contact Marguerite Mizelle, 183 Goldwin Smith Hall, for German.

The appropriate department of instruction within the university sets the standards of achievement that must be met for advanced placement in its subject, recommends AP credit for those who meet the standards, and determines which Cornell courses the credit places students out of. The final decision for awarding advanced placement credit at Cornell rests with each individual college. For policies governing advanced placement in a specific college, see the academic information section for that college. Students need not accept advanced placement. They may repeat the course they have placed out of, thereby relinquishing the advanced placement credit.

Advanced placement examinations. Entering freshmen should have their scores from CEEB Advanced Placement Examinations sent to their college or school office (see below, "Forwarding of scores and transcripts").

Departmental advanced standing examinations. In certain subjects, students may also qualify for advanced placement or credit, or both, on the basis of departmental examinations given on campus during orientation week. A schedule of these examinations appears in the orientation booklet mailed in late summer to entering students. The departments that award advanced placement and credit on the basis of departmental examinations are shown on pages 5, 6 and 7.

Transfer of credit. Entering freshmen who have completed college courses for which they want to receive credit toward their Cornell degree should send transcripts and course syllabi to their college or school office (see the list at the end of this section). The award of credit or placement for such courses is determined by the appropriate departments according to individual school and college guidelines. Because policy for using advanced placement credit varies according to each college or school's professional and academic goals, students should consult the relevant section of *Courses of Study* or their college or school office to determine how they may use such credit.

Written inquiries. Students can address questions to departments, schools, or college offices by adding Ithaca, New York 14853 to the addresses given in the following sections.

Forwarding of scores and transcripts. Entering freshmen should have their advanced placement test scores sent to their school or college registrar's office.

College of Agriculture and Life Sciences
140 Roberts Hall

College of Architecture, Art, and Planning
B30 West Sibley Hall

College of Arts and Sciences
172 Goldwin Smith Hall

College of Engineering
158 Olin Hall

School of Hotel Administration
174B Statler Hall

College of Human Ecology
N145 Van Rensselaer Hall

School of Industrial and Labor Relations
101 Ives Hall

DETERMINATION OF CREDIT AND PLACEMENT

The table on pages 6 and 7 provides information on how credit and placement are determined for most subjects. Supplementary information for subjects requiring additional explanation is provided below.

Biological Sciences

Any student who earns a score of 5 on the CEEB Advanced Placement Examination in biology may elect to receive eight credits and be exempted from all introductory biology courses.

Students not majoring in biological sciences who score a 4 may earn six advanced placement credits. This will satisfy the distribution requirement in biological sciences for students in the College of Human Ecology and a portion of the group B distribution requirement for students in the College of Agriculture and Life Sciences. For students in the College of Arts and Sciences, credits may be applied toward distribution in science and quantitative reasoning as stipulated by the college.

Biological sciences majors who receive a score of 5 may receive eight credits and be exempt from all introductory biology courses or elect to receive four credits and select one of the options allowed for majors with a score of 4. The student receiving a score of 4 must fulfill the introductory biology requirement by taking BIO G 101–102, 101/103, 102/104, or 103–104 or 105 or 106 (Biological Sciences, Lectures and Laboratory). These students should consult information available in the BIO G 101–104 course office (1140 Comstock Hall) and in the Office of Undergraduate Biology (216 Stimson Hall) to determine which semester to complete the introductory biology requirement. For students in doubt, BIO G 101/103 is advised. These students will receive a total of eight introductory biology credits (four advanced placement credits plus four course credits).

Chemistry

The Department of Chemistry offers two sequences that satisfy prerequisites for further work in the department: Chemistry 207–208, an eight-credit sequence that includes qualitative analysis, and Chemistry 215–216, a nine-credit sequence that includes qualitative and quantitative analysis.

Freshmen may qualify for advanced placement and advanced standing credits in chemistry by satisfactory performance on the CEEB Advanced Placement Examination in chemistry or by passing an advanced standing examination offered by the department. A score of 5 on the CEEB examination entitles a student to four credits. A student may earn four or eight credits by suitable performance on the departmental examination. To take the departmental examination students must sign up beforehand in 131 Baker Laboratory.

The specific course in which a student will register after having received a certain advanced placement standing will be decided by consultation between the student, his or her adviser, and the professors teaching the courses. Questions may also be directed to Dr. Stanley Marcus, associate director of undergraduate studies, in 138 Baker Laboratory. Students receiving advanced placement who are interested in a major in chemistry or a related science should consider taking Chemistry 215–216 and should consult the Chemistry 215 instructor or Dr. Stanley Marcus.

Classics

For advanced placement and credit in Latin and ancient and modern Greek, students should consult the Department of Classics, 120 Goldwin Smith Hall. Credit and placement are determined on the basis of a departmental examination. A student who is permitted to register in a 300-level course (or, in Modern Greek, is determined to be at an advanced level) will be given six advanced placement credits.

Computer Science

Students who receive a score of 4 or 5 on the CEEB Advanced Placement Examination in computer science will receive four advanced placement credits and may take Computer Science 211. These credits may be used to satisfy the requirement in computer programming for students in the College of Engineering or part of the distribution requirement in science and quantitative reasoning for students in the College of Arts and Sciences.

Freshmen may also earn four credits by suitable performance on a departmental examination to be given during orientation week. To take the departmental examination, students must sign up beforehand in the Undergraduate Office, 303 Upson Hall.

English

The English department will grant 3 credits to students who score 5 on the CEEB Advanced Placement Examination in English Literature and Composition or English Language and Composition. Students in Arts and Sciences may receive credit for one English AP exam only. The credits are granted automatically: no application to the department is required.

Students who receive scores of 700 or better on the CEEB SAT II examination in English composition, 700 or better on the CEEB SAT II examination in literature, or 4 or 5 on either CEEB Advanced Placement Examination in English are eligible to enroll, space permitting, in the following English freshman writing seminars: 270, 271, 272.

Mathematics and Statistics

The Cornell calculus sequences discussed below are described under "Basic Sequences" in the Department of Mathematics section of this catalog.

The non-engineering freshman calculus courses at Cornell do not differ substantially from calculus courses given in many high schools, and it is best to avoid repeating material that has already been covered at an appropriate level. Secondary school students who have had the equivalent of at least one semester of analytic geometry and calculus should, if possible, take one of the CEEB's two Advanced Placement Examinations (Calculus AB or Calculus BC) during their senior year.

Students who have been awarded Advanced Placement credit for calculus or statistics may not also receive academic credit for similar courses taken at Cornell. In particular, students who have been awarded AP credit for 1 semester of calculus (4 academic credits)

may not also receive academic credit for any first-semester calculus course (MATH 106, 111, 121, 190, 191). Students who have been awarded AP credit for 2 semesters of calculus (8 academic credits) may not also receive academic credit for any first-semester calculus course (MATH 106, 111, 121, 190, 191) nor for any second-semester calculus course (MATH 112, 122, 192). Arts & Sciences students receive a maximum of 8 credits for AP Math AB and BC combined. Finally, students who have been awarded AP credit for statistics (3 academic credits) may not also receive academic credit for any of the introductory statistics courses BIO M 200, ILRST 210, or MATH 171.

The following rules apply to students in all colleges and programs except the College of Engineering and the Agricultural and Biological Engineering (ABEN) program in the College of Agriculture and Life Sciences. Rules applicable to students in these engineering programs are provided near the end of this section.

Students with a score of 4 or 5 on the BC examination may take any of the following third-semester courses (MATH 221, 223, or 213). Students with these scores who wish to take courses in the engineering calculus sequence and who have had no multivariable calculus may give up their AP credit for the second semester and take the second-semester engineering calculus course, Math 192. On the other hand, students with scores of 4 or 5 on the BC examination who can also demonstrate sufficient mastery of introductory multivariable calculus (which is covered in MATH 192 but not on the BC examination) may obtain permission from the Department of Mathematics to take either of the second-year engineering calculus courses, MATH 293 or 294. Students with a 3 on the BC examination, or a 3, 4, or 5 on the AB examination, may take any of the second-semester calculus courses (MATH 112, 122, or 192); however, students in the latter category who take MATH 192 may have to make up some material on techniques and applications of integration. For purposes of advanced placement and credit, AB subscores on the BC examination are regarded as equivalent to the same scores on the AB examination. Students who receive the borderline passing score of 3 on the AB examination or an AB subscore of 3 on the BC examination, who wish to continue with calculus, are strongly advised to take MATH 112 rather than the more demanding courses 122 or 192. Advanced placement credit will be awarded appropriately; however, no credit will be granted for a score of 1 or 2 on the AB examination, nor for a score of 1 or 2 on the BC examination unless the AB subscore on that examination is at least 3.

A placement examination in mathematics for non-engineering students is offered at Cornell only during Orientation Week and should be taken by

1) students who have had at least a semester of calculus but did not take a CEEB Advanced Placement Examination; or
2) students who believe that the placement assigned on the basis of the CEEB Advanced Placement Examination is not high enough in their case.

The exam covers the material of the AP calculus program. Students are strongly urged to take this departmental placement exam even if they feel that their grasp of the material is uncertain. The grade on this test does not become a part of the student's record. No advance registration for the departmental examination is necessary.

The College of Engineering and the Agricultural and Biological Engineering (ABEN) program in the College of Agriculture and Life Sciences will give credit for MATH 191 (4 credits), and permission to take MATH 192, for a score of 3, 4, or 5 on the BC examination, or the score of 5 on the AB examination, or for a satisfactory score on the Engineering Mathematics Placement Examination. Credit for MATH 191 and 192 (8 credits), and permission to take MATH 293 or 294, will be given to students in the Engineering College or ABEN program who achieve a suitably high score on the Engineering Mathematics Placement Examination.

Students will receive academic credit for two semesters of calculus, and permission to take any third-semester calculus course, for scores of A or B on the General Certificate of Education (GCE) Advanced ("A") Level Examination, or scores of 6 or 7 on the International Baccalaureate (IB) Higher Level Examination, in mathematics. They will receive credit for one semester of calculus, and permission to take any second-semester calculus course, for scores of C on the GCE "A" Level Examination. These rules for international credentials in mathematics apply to all students, including those in engineering programs.

Modern Foreign Languages

Students who have studied a language for two or more years and want to continue study in that language at Cornell must present the results of a placement test. See "Placement Tests and Advanced Placement credit" under "Foreign Language Requirements" in the Arts and Sciences section of this catalog. Students who have had a year of formal study or substantial informal study since they last took a placement test should take the examination again during Orientation Week if they plan to continue course work.

Advanced standing credit may be entered on a student's record as follows:

1) Students with a score of 4 or 5 on the language Advanced Placement Examination of the CEEB, earn three credits, and are eligible to take Cornell's Advanced Standing Examination (CASE). Outstanding performance on this examination can result in three additional credits.
2) Students who achieve a minimum score of 65 on the Cornell language placement test given during Orientation Week are eligible to take Cornell's Advanced Standing Examination (CASE). Oustanding performance on this examination can result in a maximum of six credits.
3) For formal language work at an accredited college, credit is considered by the department on submission of a transcript and may be entered on the student's Cornell record.
4) Native speakers of languages other than English may, on examination by the appropriate professor, be granted a maximum of six credits if they can demonstrate proficiency equivalent to course work on the 200 level or above at Cornell. Additional credit will be awarded only for those who complete advanced college courses in their native language.

Information about times and places of placement tests is available in the orientation booklet and from Academic and Career Counseling Services on the web at dml.cornell.edu/html/place/testschedule.html. For more information, see the College of Arts and Sciences section on language course placement, or contact Callean Hile, 303 Morrill Hall for French, Italian, and Spanish; Miriam Zubal, 183 Goldwin Smith Hall, for German; Doreen Silva, 226 Morrill Hall, for Russian; Kim Robinson, 388 Rockefeller Hall, for Asian languages, Nava Scharf, 350 Rockefeller Hall for Hebrew; Munther Younes, 421 Rockefeller Hall, for Arabic.

Music

Advanced placement and credit are awarded only in music theory and only on the basis of a comprehensive examination administered by the Department of Music, normally during orientation week. If special arrangements are made, the examination may be administered at other times during the academic year. Inquiries may be directed to the Department of Music (telephone: 607–255–4097).

Physics

Advanced placement and credit are awarded on the basis of the CEEB Advanced Placement Examination in physics (Physics B or Physics C), certain international examinations, or the departmental examination (which may be taken during Orientation Week or at other times as arranged). For information about the departmental examination, students should consult the director of undergraduate studies, 101 Clark Hall, or the department chair, 109 Clark Hall.

Physics B: Students earning a score of 4 or 5 may receive eight credits for noncalculus-based Physics 101 and 102. Those earning a score of 5 in physics B and a score of 4 or 5 in calculus BC may choose to accept four credits in calculus-based PHYS 112 or 207 instead of eight credits in PHYS 101 and 102. Those earning a score of 3 will receive four credits in Physics 101.

Physics C—Mechanics: Students earning a score of 4 or 5 may receive four credits for PHYS 112 or 207, or placement into PHYS 116, a first-semester honors course, with no AP credit.

Physics C—Electricity and Magnetism: Students earning a score of 5 may receive four credits for PHYS 213.

Students may not accept credit for an advanced placement course if they receive credit for a Cornell course with similar content. Students may receive credit for only one of the courses in each group:

PHYS 101, 112, 116, 207

PHYS 102, 208, 213, 217

A student planning a major in Physics or Applied and Engineering Physics and who is eligible for AP credit should consult with his/her adviser or the department representative.

Advanced placement into a next-in-sequence course depends on the completion of the appropriate mathematics prerequisites before enrolling. To qualify for advanced placement credit, it is not necessary to continue the study of physics.

General information and advice may be obtained from the director of undergraduate studies, 101 Clark Hall, or from the Department of Physics, 109 Clark Hall.

ADVANCED PLACEMENT AND CREDIT FOR INTERNATIONAL CREDENTIALS

Following are the policies currently in effect for G.C.E. "A" Level Examinations and International Baccalaureate Higher Level Examinations. Students may submit results of the French *Baccalaureat* or German *Abitur* for possible credit depending on the stream or specialization followed. Accepted students holding any other secondary school credentials are urged to sit for the Advanced Placement Examinations of the College Entrance Examination Board or for the departmental examinations offered during orientation week.

General Certificate of Education (GCE) Advanced ("A") Level Examination passes are awarded advanced standing and credit. Students must present the original or a certified copy of their examination certificate in order to receive credit.

Following is a list of subjects and the marks for which credit will be awarded:

Subject	*Marks*	*Credit*
Biology	A or B	8 credits (Intro Bio)
Chemistry	A	8 credits (CHEM 207 and 208)
	B	4 credits (CHEM 207)
Economics	A	6 credits (ECON 101 and 102)
English Literature	A	3 credits (placement out of one first-year writing seminar)
	B	3 credits (for all students except Arts and Science students)
History	A, B, or C	4 credits
Mathematics	A or B	8 credits (MATH 111 and 112)
	C	4 credits (MATH 111)
Music		subject to departmental review
Philosophy	A or B	3 credits
Physics	A or B	4 credits for PHYS 101, 112, or 207. 4 additional credits for PHYS 213 are granted for a combination of grades of A or B and a minimum of 8 Advanced Placement or Advanced Standing credits in Mathematics. Students planning to major in physics are encouraged to enroll in PHYS 116. If students take 116; they do not receive 4 credits for 112. If students take 217, they do not receive credit for 213.

International Baccalaureate (IB) Higher Level Examination passes are awarded advanced standing and credit on receipt of the original or a certified copy of the examination results.

Anthropology		subject to departmental review
Biology	7	8 credits (Intro BIO)
	6	6 credits (BIO 109–110)
Chemical & Physical Systems	6 or 7	8 credits (PHYS 101 and 102)
Chemistry	6 or 7	4 credits (CHEM 207)
Computer Science	6 or 7	4 credits (CS 100)
Economics	6 or 7	6 credits (ECON 101 and 102)
English Literature	7	3 credits and placement out of one first-year writing seminar
	6	3 credits (for all students except A&S students)
History	6 or 7	4 credits
Mathematics	6 or 7	8 credits (prospective math, science, and engineering majors must consult with math department to determine prerequisite for placement in third-semester math courses)
Music		subject to departmental review
Philosophy	7	3 credits
Physical Science	6 or 7	8 credits (4 credits, CHEM 206; 4 credits, PHYS 101)
Physics	6 or 7	4 credits (PHYS 101, 112, or 207)

University Registration

University registration is the official recognition of a student's relationship with the university and is the basic authorization for a student's access to services and education. Completion of registration is essential to enable the university to plan for and provide services and education, guided by the highest standards for efficiency and safety. Unauthorized, unregistered persons who use university services and attend classes have the potential to use university resources inappropriately and to displace properly registered students. In addition, the university assumes certain legal responsibilities for persons who participate as students in the university environment. For example, policy states that New York State health requirements must be satisfied. Because these requirements are intended to safeguard the public health of students, the university has a responsibility to enforce the state regulations through registration procedures.

The policy on university registration is intended to describe clearly the meaning of and the procedures for registration so that students can complete the process efficiently and be assured of official recognition as registered students. With the clear communication of the steps for registration, it is hoped that compliance will occur with a minimum of difficulty.

To become a registered student at Cornell University, a person must

- complete course enrollment according to individual college requirements;
- settle all financial accounts, including current semester tuition;
- satisfy New York State health requirements;
- have no holds from the college, the office of the Judicial Administrator, University Health Services, or the Bursar.

Individuals must become registered students by the end of the third week of the semester or they will be subject to a financial penalty.

Cornell University does not allow persons who are not registered with the university in a timely manner to attend classes. The university reserves the right to require unauthorized, unregistered persons who attend classes or in other ways seek to exercise student privileges to leave the university premises. The university does not permit retroactive registration and does not record courses or grades for unregistered persons.

COURSE ENROLLMENT

Pre-course enrollment for each semester at Cornell takes place partway through the preceding semester. Dates are announced in advance and are posted in school and college offices. Students are expected to meet with their advisers during this period to affirm that the courses they plan to take will ensure satisfactory progress toward a degree.

New students and transfer students may be sent course enrollment instructions by their college offices before they arrive on campus. Procedures vary from college to college.

COURSE ADD/DROP/CHANGE

Students may adjust their schedules during add/drop/change periods. A form is completed by the student and signed by both the student's adviser and an appropriate representative of the department offering the course (an instructor, department staff member, or college registrar, depending on the college). The completed and signed form must be returned to the student's college office to be processed. Professional schools, Continuing Education and Summer Sessions, and the Department of Physical Education and Athletics have different course enrollment and add-drop policies. See the chart below for their course add/drop/change fees.

Late Course Enrollment and Late Add/Drop/Change Fees

Academic Unit	*Late Course Enrollment Fee*	*Late Course Add/Drop/ Change Fee*
Continuing Education and Summer Sessions	†	†
Johnson Graduate School of Management	$100	$100
Law School	No fee	No fee
Physical education	$30	$20*
Veterinary medicine	$30*	$30*

*Consult the college office for special considerations and requirements.

†Consult the Summer Session catalog and the Division of Extramural Study brochure for fees.

AUDITING COURSES

Summer school and extramural students may officially register as visitors (auditors) in courses and have this entered on their permanent records if their attendance is reported as satisfactory. Graduate students may register for courses as auditors but will not have the courses listed on their transcripts. Undergraduates may not register to audit courses.

LEAVES AND WITHDRAWALS

A leave of absence must be requested from the college in which the student is enrolled. A leave of absence is granted for a specified time, after which the student is expected to return to resume course work. Students should inform their college of intent to return.

A student may withdraw from the university at the student's discretion. In addition, a college may withdraw a student who fails to return at the end of a period of authorized leave.

Medical leaves are granted and processed through University Health Services.

Internal Transfer Division

Students may not always be satisfied with the original Cornell school or college into which they've been admitted. They may decide to transfer from one college to another, within the university. This process is called internal transfer, and application procedures and deadlines vary by college. It may be possible to be admitted directly into a new program. Students who are uncertain if they immediately qualify for direct transfer, however, should apply to the Internal Transfer Division (ITD).

To apply, candidates must interview with the division's director and submit an essay to the ITD office outlining their reasons for wanting to transfer. Internal Transfer Division applicants must also fulfill the application requirements (e.g., interviews, essays) of their target college as if they were applying for direct transfer. In many cases, colleges formally sponsor students in ITD and essentially guarantee admission if students successfully complete the requirements (taking particular courses, earning a specified grade point average while enrolled in ITD) that are outlined in their letter of sponsorship. Although sponsorship does not guarantee admission to the Internal Transfer Division, it is the most important factor determining acceptance into ITD. Students can apply simultaneously for direct transfer and to ITD, so that if direct transfer is denied they might be offered the option of being sponsored in the Internal Transfer Division.

For more information about transfer requirements, students should contact the admissions office of the college they hope to enter and the office of the Internal Transfer Division, 220 Day Hall (255–4386).

Bursar Information

TUITION, FEES, AND EXPENSES

Tuition for Academic Year 2001-2002

Endowed Divisions

Undergraduate

Architecture, Art, and Planning Arts and Sciences Engineering Hotel Administration	$25,970

Graduate

Graduate School (with major chair in an endowed division)	25,970

Professional

Law School	
Entering students	29,200
2nd year students	28,650
3rd year students	28,150
Management	29,500

Statutory Divisions

Undergraduate

Agriculture and Life Sciences Human Ecology Industrial and Labor Relations	
New York resident*	$11,970
Nonresident*	22,200

Graduate

Graduate School (with major chair in agriculture, human ecology, or industrial and labor relations)	13,910
Graduate School—Veterinary Medicine	14,140

Professional

Veterinary Medicine	
New York resident	16,540
Nonresident	22,240

Summer Session (2001)

Per credit	$650

Other Tuition and Fees

In absentia fees	
Graduate	$200 per term
Undergraduate	15 per term
Law and Management	75 per term

The amount, time, and manner of payment of tuition, fees, or other charges may be changed at any time without notice.

*Residency status is determined at the time of admission by the college. Change in residency status is determined by the University Bursar.

Fees and Expenses

Undergraduate applicants to Cornell pay a nonrefundable $65 application fee when submitting an application for admission. The graduate application fee is $65. Application to the Johnson Graduate School of Management costs $150.

Tuition Refund Policy

Amounts personally paid for tuition may be refunded if the student requests a leave of absence or withdrawal from the office of the dean of his or her college of enrollment. The date of this request will determine the tuition liability for the semester. Previously matriculated students who terminate their registration with the university during a fall or spring semester in this manner will be charged tuition from the university registration day through the date of their request as follows: first six days of the semester (including university registration day), no charge; seventh day of the semester, 10 percent; second week, 20 percent; third week, 30 percent; fourth week, 40 percent; fifth week, 60 percent; sixth week, 80 percent; seventh week to the end of the semester, 100 percent.

First-time matriculants will be charged tuition from the university registration day through the date of their request as follows: first six days of the semester (including university registration day), no charge; seventh day of the semester, 10 percent; second and third weeks, 20 percent; fourth week, 30 percent; fifth and sixth weeks, 40 percent; seventh week, 50 percent; eighth and ninth weeks, 60 percent; tenth week to the end of the semester, 100 percent.

Repayment policy. Students receiving financial aid from the university who withdraw during a term will have their aid reevaluated, possibly necessitating repayment of a portion of aid received. Repayment to aid accounts depends on the type of aid received, government regulations, and the period of time in attendance. A partial semester will generally count as one of the eight semesters of financial aid eligibility normally allowed a student.

Proration Schedule for Withdrawals and Leaves of Absence

Fall 2001 and Spring 2002

Previously Matriculated Students

Percentage	Fall 2001	Spring 2002
No charge	8/28–9/2	1/17–1/22
10% charge	9/3	1/23
20% charge	9/4–9/10	1/24–1/30
30% charge	9/11–9/17	1/31–2/6
40% charge	9/18–9/24	2/7–2/13
60% charge	9/25–10/1	2/14–2/20
80% charge	10/2–10/8	2/21–2/27
100% charge	10/9	2/28

First-Time Matriculated Students

No charge	8/28–9/2	1/17–1/22
10% charge	9/3	1/23
20% charge	9/4–9/17	1/24–2/6
30% charge	9/18–9/24	2/7–2/13
40% charge	9/25–10/8	2/14–2/27
50% charge	10/9–10/15	2/28–3/6
60% charge	10/16–10/29	3/7–3/20
100% charge	10/30	3/21

BILLING AND PAYMENT

Billing

Tuition and room and board charges will be billed in July and December and must be paid prior to registration. The due date for these semester bills will normally be five to ten working days prior to registration day. All other charges, credits, and payments will appear on monthly statements mailed before the twenty-fifth of every month.

It is possible that some charges will not be listed on the first bill and will appear on a subsequent monthly bill. *A student must be prepared to pay any charges appearing on a subsequent bill even though the student receives a financial aid stipend before the charges are billed.*

All bills are due by the date stated on the bill; all payments must be *received* by that date to avoid *finance charges*. Payments are *not* processed by postmark.

Please inform the Office of the Bursar of any change in billing address. *Address changes made at other offices will not change the billing address.* The address initially used on billing statements will be the home address as listed on each student's application for admission.

Payments

An individual who has outstanding indebtedness to the university will not be allowed to register or reregister in the university, receive a transcript of record, have academic credits certified, be granted a leave of absence, or have a degree conferred. University policy precludes the use of any current financial aid for payment of past-due charges.

The Office of the Bursar acts as a clearinghouse for student charges and credits that are placed directly on a student's bill by several departments and offices of the university. *Since the Office of the Bursar does not have detailed records concerning many items that appear on a bill, students should contact the office involved if they have questions.*

For further information, students should contact the Office of the Bursar, Cornell University, 260 Day Hall, Ithaca, New York 14853–2801 (telephone: 607–255–2336; fax: 607–255–6442). E-mail UCO-Bursar@cornell.edu

STUDENT HEALTH INSURANCE

Because of the high cost of medical care, it is Cornell University policy that every full-time registered student must have health insurance coverage.

The Student Health Insurance Plan is developed especially for Cornell students and provides extensive coverage at a reasonable cost for most on- or off-campus medical care. Complete and current details of the SHIP, its cost, and population-specific material for Undergraduates, Graduate Students and Professional Students is mailed to each student with the July bursar bill. Undergraduates, Graduate Students and Professional Students each have separate deadlines and guidelines. Please be sure to check your July bursar bill for complete details.

The Student Health Insurance Plan provides coverage twenty-four hours a day, 365 days a year, anywhere in the world. Students graduating mid-year may be eligible to purchase a five-month plan. Students enrolled in the SHIP may enroll their eligible dependents for an additional cost (fall deadline: September 30). Graduate and professional students who prefer to pay monthly must enroll in the installment payment plan no later than September 30. Because of policy restrictions, the plan is nonrefundable (except for dependents who no longer meet eligibility requirements and students who withdraw from Cornell within the first 30 days of the academic year).

For more information, contact the:

Student Insurance Office

Gannett Health Center
Ho Plaza
Ithaca, NY 14853–3101, USA
Telephone: 607–255–6363
E-mail: SICU@cornell.edu
Web: www.gannett.cornell.edu/student_insurance

Class Attendance, Meeting Times, and Examinations

CLASS ATTENDANCE AND ABSENCES

Students are expected to be present throughout each term at all meetings of courses for which they are registered. The right to excuse a student from class rests at all times with the faculty member in charge of that class.

Absences because of religious beliefs. In accordance with Section 224-a of the New York State Education Law, each student who is absent from school because of his or her religious beliefs must be given an equivalent opportunity to register for classes or make up examinations, study, or work requirements that he or she may have missed because of such absence on any particular day or days. No fees of any kind shall be charged by the university for making available to such student such equivalent opportunity.

Class Meeting Times

Monday/Wednesday

	Start Times	End Times
50 MIN	08:00 AM	08:50 AM
75 MIN	08:40 AM	09:55 AM
50 MIN	09:05 AM	09:55 AM
50 MIN	10:10 AM	11:00 AM
50 MIN	11:15 AM	12:05 PM
50 MIN	12:20 PM	01:10 PM
50 MIN	01:25 PM	02:15 PM
50 MIN	02:30 PM	03:20 PM
75 MIN	02:55 PM	04:10 PM
50 MIN	03:35 PM	04:25 PM
50 MIN	07:30 PM	08:20 PM
75 MIN	07:30 PM	08:45 PM
50 MIN	08:35 PM	09:25 PM

Tuesday/Thursday

50 MIN	08:00 AM	08:50 AM
75 MIN	08:40 AM	09:55 AM
50 MIN	09:05 AM	09:55 AM
50 MIN	10:10 AM	11:00 AM
75 MIN	10:10 AM	11:25 AM
50 MIN	11:15 AM	12:05 PM
75 MIN	11:40 AM	12:55 PM
50 MIN	12:20 PM	01:10 PM
50 MIN	01:25 PM	02:15 PM
75 MIN	01:25 PM	02:40 PM
50 MIN	02:30 PM	03:20 PM
75 MIN	02:55 PM	04:10 PM
50 MIN	03:35 PM	04:25 PM

NO EVENING CLASSES

Friday

50 MIN	08:00 AM	08:50 AM
50 MIN	09:05 AM	09:55 AM
50 MIN	10:10 AM	11:00 AM
50 MIN	11:15 AM	12:05 PM
50 MIN	12:20 PM	01:10 PM
50 MIN	01:25 PM	02:15 PM
50 MIN	02:30 PM	03:20 PM
50 MIN	03:35 PM	04:25 PM

NO EVENING CLASSES

Laboratories and similar exercises

1 HR 55 MIN	08:00 AM	09:55 AM
	10:10 AM	12:05 PM
	12:20 PM	02:15 PM
	02:30 PM	04:25 PM
(Mon. and Wed.)	07:30 PM	09:25 PM
2 HR 25 MIN	07:30 AM	09:55 AM
	10:10 AM	12:35 PM
	02:00 PM	04:25 PM
(Mon. and Wed.)	07:30 PM	09:55 PM
3 HR	08:00 AM	11:00 AM
	10:10 AM	01:10 PM
	01:25 PM	04:25 PM
(Mon. and Wed.)	07:30 PM	10:30 PM

No classes or laboratory exercises are to be held between the hours of 4:25 P.M. and 7:30 P.M. Monday through Thursday, after 4:25 P.M. on Friday, after 12:20 P.M. on Saturday, and all day Sunday.

Evening preliminary examinations that will be given outside of normal class hours may be scheduled on Tuesday and Thursday evenings only, beginning at 7:30 P.M. All room assignments are scheduled by the Office of the University Registrar. The dates and times of these examinations are listed in the course rosters for each term.

Evening academic activities commencing at 7:30 P.M. on Mondays and Wednesdays, other than regularly scheduled courses and prelims previously approved by the office of the university faculty, are not permitted. Violation of these rules interferes with other university activities (athletic, musical, theatrical, employment, etc.).

Any exception to the above regulations, other than those for evening preliminary examinations, will require permission of the dean or director of the college or school offering the course. Exceptions to the regulations on evening preliminary examinations require approval of the dean of the university faculty. All such exceptions must include provision of special arrangements for the students for whom conflicts are generated by such an exception.

FINAL EXAMINATIONS

Final examinations for undergraduate courses are scheduled by the Office of the University Registrar. Examinations may be one, two, or two and one-half hours in length at the discretion of the department concerned. The schedule of final examinations is available in the *Course and Time Roster* and the *Course and Room Roster,* both of which are published through the Office of the University Registrar each semester and on the web at www.cornell.edu/Academic/class.html.

General Rules Governing Final Examinations

Legislation of the university faculty governing study periods and examinations is as follows:

1. No final examinations can be given at a time other than the time appearing on the official examination schedule promulgated by the Office of the University Registrar without prior written permission of the dean of the faculty.
2. No permission will be given, for any reason, to schedule final examinations during the last week of classes or the designated study period preceding final examinations.
3. Permission will be given by the dean of the faculty to offer an alternate examination during the examination period itself if requested in writing by the faculty member, but only on condition that a comparable examination also be given for those students who wish to take it at the time the examination was originally scheduled. The faculty member requesting such a change shall be responsible for making appropriate arrangements for rooms or other facilities in which to give the examination. This should be done through the university registrar's office.
4. No tests are allowed during the last week of scheduled classes unless such tests are part of the regular week-by-week course program and are followed by an examination (or the equivalent) in the final examination period.
5. Papers may be required of students during the study period if announced sufficiently far in advance that the student did not have to spend a significant segment of the study period completing them.
6. Faculty can require students to submit papers during the week preceding the study period.
7. Take-home examinations should be given to classes well before the end of the regular term and should not be required to be submitted during study period but rather well into the examination period.

The university policies governing study period and final examinations are:

a) Each course should require that a final examination or some equivalent exercise (for example, a term paper, project report, final critique, oral presentation, or conference) be conducted or due during the period set aside for final examinations.

b) Although not specifically prohibited, it is university policy to discourage more than two examinations for a student in one 24-hour time period and especially on any one day. It is urged that members of the faculty consider student requests for a make-up examination, particularly if their course is the largest of the three involved and thus has the strongest likelihood of offering a make-up for other valid reasons, i.e., illness, death in the family, etc.

c) Students have a right to examine their corrected exams, papers, etc., to be able to question their grading. (Note that students have no absolute right to the return thereof.) Exams, papers, etc., as well as grading records, should be retained for a reasonable time after the end of the semester, preferably till the end of the following term, to afford students such right of review.

EVENING PRELIMINARY EXAMINATIONS

The most convenient times and places for "prelims" are the normal class times and classrooms. In cases where the only alternative is to hold evening preliminary examinations, they may be scheduled only on Tuesday and Thursday evenings and only after 7:30 P.M.

An alternative time to take the examination *must* be provided for those students who have academic, athletic, or employment conflicts at the time scheduled.

Note that instructors holding evening examinations are strongly urged to indicate this in the course descriptions listed in *Courses of Study* and *must* notify students of the dates of such examinations as early as possible in the semester, preferably when the course outline is distributed. For more information on the policy governing evening examinations, contact the office of the dean of the faculty, 315 Day Hall.

Grading Guidelines

The official university grading system is composed of letter grades with pluses and minuses. Passing grades range from A + to D-; F is failing. INC denotes a grade of incomplete, and R is the grade given at the end of the first semester of a year-long course. The grades of INC and R do not have quality-point equivalents attached. These are the quality-point equivalents:

A+ =4.3	B+ =3.3	C+ =2.3	D+ =1.3
A =4.0	B =3.0	C =2.0	D =1.0
A– =3.7	B- =2.7	C- =1.7	D- =0.7
			F =0.0

This is how a term average is computed:

Course	*Grade*	*Points*		*Quality Credits*		*Product*
Chemistry 103	B+	3.3	x	3	=	9.9
English 151	C–	1.7	x	3	=	5.1
DEA 145	B	3.0	x	4	=	12.0
CEH 100	B	3.0	x	3	=	9.0
DEA 111	C	2.0	x	3	=	6.0
Total				16		42.0

To arrive at the term average, add the products (credits x quality points) and divide by the number of credits taken. Here, 42 divided by 16 equals 2.63.

The cumulative average (an average of grades from two or more terms) equals the sum of the products of all the grades at Cornell divided by the total number of credits taken.

S-U GRADES

On September 6, 1972, the Faculty Council of Representatives passed the following legislation:

"Resolved, that:

A. the S-U system have symbol equivalents which are uniform within the university: "S" means C– or above; "U" means D+, D, D–, or failure.

B. S-U options be chosen by the student during the first three weeks of the term.

C. the Announcements and/or supplementary course registration materials describing each course include a description of the course grading options, particularly if the course is graded with an exclusive S-U. Any change in grading options must be announced by the instructor within the first two weeks of the term.

D. course requirements (required reading, term paper, etc.) be the same for students electing S-U grades as for those electing letter grades."

The rules for the S-U option are further defined by each of the academic units. They are as follows:

Agriculture and Life Sciences. (a) Must have 100 credit hours with A, B, C, D grades. (b) The S-U option is available only in those courses so designated in the course catalog after approval by the Educational Policy Committee. (c) Freshmen may not exercise the S-U option.

Architecture, Art, and Planning. (a) All courses specifically required for a degree excluded. Various departments may designate specific required courses where S-U will be permitted. (b) In a course designated as S or U, the entire class is so graded. The instructor must announce this decision within the first

two weeks of class. (c) Where the option for S or U exists, both student and instructor must agree on the option. This agreement must be made by the end of the third week of classes on the appropriate form in the college office. Once agreed upon, this grade option will be used for the final grade.

Arts and Sciences. (a) Courses that count toward satisfaction of major requirements should not be taken for an S or U grade unless the department grants permission. (b) Permission of instructor. (c) A minimum of 80 of the 120 hours required for the A.B. degree must be in courses for which the student has received letter grades.

Engineering. (a) May take one Humanities and Social Sciences, Approved, or Free Elective per term after completing first semester. (b) This option may be elected during Pre–Course Enrollment or with the written permission of the instructor and adviser on an add/drop form in the first 3 weeks of classes. (c) Decision is irrevocable after first three weeks of term.

Graduate School. (a) Seminars and Thesis Research courses are usually graded S-U, and should be registered accordingly or a grade error results at semester's end. Other courses may be registered as S-U only if offered as S-U option.

Hotel. (a) Maximum of four free-elective credit hours per term. (b) Exceptions are by petition only.

Human Ecology. (a) Not part of student's major. (b) May be used in the 19 hours required outside the major in Human Ecology courses. (c) Not part of hours required in humanities, natural sciences, and social sciences. (d) A department may approve S-U grading in specific courses if approved by Educational Policies Committee. (e) Freshmen enrolled in ENGL 137 and 138, which are only offered for S-U credit, are permitted to apply these courses to the freshman seminar requirements. (f) Total of 12 credits in S-U courses (not counting PE) may be counted towards degree requirements during a student's college career.

Industrial and Labor Relations. (a) This option may be elected, if available in I&LR electives, or in out-of-college electives but not including directed studies. (b) Degree requirements include a minimum of 105 lettergrade (A+ to D-) credits. (c) Student must also be in good academic standing. (d) A "U" is considered the equivalent of an "F" in determining a student's academic status. (e) Limited to two courses per term, not to exceed four hours in any one course.

Internal Transfer. (a) S-U grades permitted only when it is the only option or (b) when specifically approved by an admissions officer in the school or college to which the student plans to transfer.

Veterinary Medicine. (a) There is one foundation course in the verterinary curriculum that is offered on an S-U basis only. All other required core courses must be taken for a letter grade. (b) Elective courses for veterinary students may be offered on an S-U basis at the option of the professor.

INCOMPLETE

The grade of incomplete is appropriate only when two basic conditions are met:

1) the student has a substantial equity at a passing level in the course with respect to work completed, and
2) the student has been prevented by circumstances beyond the student's control, such as illness or family emergency, from completing all of the course requirements on time.

A grade of incomplete may not be given merely because a student fails to complete all course requirements on time. It is not an option that may be elected at the student's own discretion.

While it is the student's responsibility to initiate a request for a grade of incomplete, reasons for requesting one must be acceptable to the instructor, who establishes specific make-up requirements. The instructor has the option of setting a shorter time limit than that allowed by the student's college for completing the course work. Several colleges require that a statement signed by the instructor be on file indicating the reason for the grade of incomplete and the restriction, if any.

It is the responsibility of the student to see that all grades of incomplete are made up within the deadline and that the grade has been properly recorded with the student's college registrar.

CHANGES IN GRADES

Changes in a grade may be made only if the instructor made an error in assigning the original grade.

OFFICIAL TRANSCRIPTS

An official transcript is one that bears the official signature of the university registrar, sent in a sealed envelope directly from the Office of the University Registrar to another institution or agency as directed by the student. Transcripts can be obtained through the Office of the University Registrar, B7 Day Hall.

University Requirements for Graduation

The *university* has only two requirements for graduation that must be fulfilled: the swim test and physical education courses. A student's *college* determines degree requirements such as residency, number of credits, distribution of credits, and grade averages. See the individual requirements listed by each college or school or contact the college registrar's office.

PHYSICAL EDUCATION

Classes

All undergraduate students must complete two terms of work in physical education unless exempted from this requirement for medical or other special reasons or by virtue of advanced standing on admission. For transfer students the requirement is reduced by the number of terms satisfactorily completed, not necessarily including physical education, in a college of recognized standing before entering Cornell.

Credit in physical education may be earned by participating in courses offered by the Department of Athletics and Physical Education, participating on an intercollegiate athletic team as a competitor or manager, or performing in the marching band.

Physical education is a requirement of the first two terms at Cornell. Students must register for it in each term, except those in which postponements are granted, until the requirement is satisfied.

Temporary postponements may be granted on the basis of physical disability, schedule conflicts, or excessive work load (employment exceeding 20 hours a week). The Gannett Health Center can provide certifications based on health, and the financial aid office can provide certifications of employment. Students should see the director or assistant director of Physical Education to establish postponements or waiver of the requirement. Questionable or unusual cases may be resolved by petition to the Faculty Advisory Committee on Athletics and Physical Education.

Swim Test

The University Faculty Committee on Physical Education has established a basic swimming and water safety competency requirement for all entering freshman undergraduate students. Normally, the test is given for women in the Helen Newman pool and for men in the Teagle pool as part of their orientation process. The test consists of a feet-first entry into the deep end of the pool and a continuous 75-yard swim using front, back, and optional strokes. Any student who cannot pass the swim test is required to include the course Basic Swimming and Water Safety in his or her program of physical education before electives can be chosen. Students will receive a grade of incomplete in Physical Education until they have passed the swim test or fulfilled the requirement by satisfactory attendance in two terms of Basic Swimming and Water Safety. Students unable to meet the swim requirement because of medical, psychological, or religious reasons must petition the University Faculty Committee on Physical Education for a waiver of the requirement. When a waiver is granted by the Faculty Committee on Physical Education, an alternate requirement is imposed. The alternate requirement substitutes a course in either Advanced First Aid (Emergency Response) or Wellness and Fitness for the original swimming requirement.

STUDENT RESPONSIBILITIES

Students are responsible for meeting all requirements for the courses in which they are enrolled, as defined by the faculty members teaching the courses. It is also the student's responsibility to be aware of the specific major, degree, distribution, college, and graduation requirements for completing his or her chosen program of studies. Students should know how far they have progressed in meeting those requirements at every stage of their academic career.

Student Records Policy

Under the Family Educational Rights and Privacy Act of 1974 (FERPA), Cornell University is required to advise students of their rights concerning their education records. Education records include records directly related to a student and maintained by an educational institution or party acting on its behalf. The law gives students the right to

a) inspect and review their education records;

b) challenge contents of education records;

c) a hearing if the challenge is unsatisfactory;

d) include an explanatory statement in the education records if the outcome of the hearing is unsatisfactory;

e) prevent disclosure of personally identifiable information*;

f) secure a copy of the institutional policy which includes the location of all education records**; and

g) file complaints with the Department of Education concerning institutional failure to comply with the act.

*Directory information is a category of personally identifiable information that includes name, home address, local address, local telephone listing, dates of attendance at Cornell, major field of study and college attended, previous educational agency or institution attended, participation in officially recognized activities (in athletics, the weight and height of members of athletic teams), degrees earned, and awards. Directory information may be released unless the student indicates otherwise at the time of registration. Students who wish no release of their directory information must inform the office of the university registrar in writing within 10 days of the date of official university registration. Students may rescind their no release request at any time in writing to the office of the university registrar.

**"Cornell University Policy on Access to and Release of Student Education Records" is available on the web at URL: www.univco.cornell.edu/policy/ASI.html.

POLICY ON POSTING OF STUDENT INFORMATION

In compliance with the university's policy on student educational records, and the U.S. Department of Education's Family Educational Rights and Privacy Act of 1974 (FERPA), restricted student information may not be posted.

Accordingly, the following student information is considered restricted and therefore may not be posted:

Student social security number

Student identification number

Courses elected

Grades earned

Grade point average

Class rank

Date of birth

Place of birth

Home telephone listing

Academic and disciplinary actions

Student or administrative committees

The most recent student educational records from previous educational agency or institution

Financial arrangements between the student and the university

Any other education record containing personally identifiable information

For further information, please refer to the revised *Policy on Access to and Release of Student Education Records* on the web at www.univco.cornell.edu/policy/asi.html.

Academic Integrity

Absolute integrity is expected of every Cornell student in all academic undertakings. Any fraudulent act by a student to advance his or her academic status merits a severe penalty and such cases are governed by the Code of Academic Integrity. A pamphlet entitled the *Code of Academic Integrity and Acknowledging the Work of Others* is distributed to new and transfer students and is also available from the office of the dean of faculty. The policy is published in the *Policy Notebook*, available free of charge from the office of the dean of students.

PROTECTION OF HUMAN SUBJECTS IN RESEARCH

The University Committee on Human Subjects is the official review board of all university projects that use humans as research subjects. Projects affected by this restriction include, but are not limited to, surveys, questionnaires, studies of existing data, documents, records in which there are no identifiers, as well as mental and physical tests of human subjects. Requests for student information must be submitted in writing to the Assistant Vice President for Academic Programs and Campus Affairs, 311 Day Hall. All proposals involving human subjects in any category must be submitted to the committee for review. Inquiries, communications, and requests for guidelines should be directed to the committee's Executive Secretary, 120 Day Hall (255–2945). The guidelines are also available at the web address www.osp.cornell.edu

USE OF ANIMALS FOR COURSES

Vertebrate animals serve as an invaluable aid in instruction. It is recognized, however, that some students have ethical objections to the use of vertebrate animals in this manner. Courses that use vertebrate animals are identified as such in the course descriptions. Students who have concerns about the use of animals in these courses should consult the course instructor for more information about the precise ways in which the animals are used. A set of university guidelines on the use of vertebrate animals in teaching for faculty and students is printed below and is available from departments in which the courses are offered.

Guidelines for Faculty and Students with Respect to the Use of Animals in Instruction

Background: On December 8, 1987, the Cornell University Institutional Animal Care and Use Committee approved a series of guidelines recommended to them by the University Animal Welfare Committee. These guidelines were prepared by a subcommittee of faculty members, after they had the opportunity to evaluate the use of animals in undergraduate teaching (and student concerns for the same) from a representative sample of instructors.

Guidelines

1. For demonstrating certain principles and procedures the use of animals in teaching is recognized as an invaluable, often essential, pedagogical device.
2. For courses in which vertebrate animals are to be used in dissection, surgery, or in other experimental procedures, the course description that appears in the Announcement "Courses of Study" should alert students to this fact.
3. A detailed description of the intended use of vertebrate animals should be available to students upon request to the instructor of each course.
4. Faculty members are encouraged to explain their reasons and need for using vertebrate animals and should indicate to students the availability of the procedures described in item 8 below.
5. Students are encouraged to discuss their concerns about the instructional use of vertebrate animals with the instructor in the course.
6. When consistent with pedagogical objectives, faculty members are encouraged to consider adopting alternative methods and procedures that do not involve the use of live animals.
7. When students object on ethical or other valid grounds, to participating in an exercise using vertebrate animals, instructors are encouraged to provide alternative means when consistent with pedagogical objectives, for learning the same material.
8. A student who is reluctant to voice his or her concerns about animal use in a particular course or who thinks these concerns have not received proper attention may seek assistance from the Director of the Cornell Center for Research Animal Resources (253–3520).

Interdisciplinary Centers, Programs, and Studies

ANDREW D. WHITE PROFESSORS-AT-LARGE

726 University Avenue (255–0832)

The program has its origins in Cornell's early history. Andrew D. White, the first president of Cornell University, inaugurated the position of nonresident professor, to be held by

eminent scholars, scientists, and intellectuals who periodically visit the university for the stated purpose of "contributing to the intellectual and cultural life of the university." Toward this end, Professors-at-Large engage in a variety of activities including public lectures, participation in ongoing courses, and collaborative research, as well as holding office hours for undergraduate and graduate students. Professors-at-Large serve for a six-year term and are full members of the faculty when in residence.

Term Ending in 2002
Chartier, Roger, cultural historian
Ernst, Richard R., physical chemist
Goodall, Jane, primatologist
Tobias, Phillip V., paleoanthropologist

Term Ending in 2003
Morrison, Toni, novelist
Rabinovich, Itamar, historian of the Middle East, diplomat

Term Ending in 2004
Bal, Mieke, cultural analyst
Cleese, John, writer and actor
MacDonald, David W., mamalogist and behavioral ecologist
Silajdzic, Haris, political leader, historian of the Middle East

Term Ending in 2005
Jemison, Mae, astronaut
McDonough, William, architect
O'Brien, Stephen J., geneticist
Schechner, Richard, director of performance studies

Term Ending in 2006
Goldsworthy, Andy, sculptor
Sacks, Oliver, physician and writer

Term Ending in 2007
Pretty, Jules, sustainable agriculture ecologist
Short, Roger, reproductive physiologist

FRANK H. T. RHODES CLASS '56 UNIVERSITY PROFESSORSHIP

To commemorate their 40th reunion, the Class of 1956 initiated an endowment to create the Frank H. T. Rhodes Class of '56 University Professorship in honor of Cornell's ninth president (1977–1995). The purpose of the Rhodes Class of '56 Professorship is to strengthen the undergraduate experience by bringing to the university individuals from every walk of life who represent excellence of achievement and to create opportunities for interaction with undergraduates. The endowment also makes it possible to create public events related to the professorship such as lectures, performances, films, art exhibits, or conferences. Rhodes Class of '56 Professors are full members of the faculty while in residence. Appointments are awarded for a period of one to five years. During each year of their appointment, Rhodes Class of '56 Professors visit the campus for a minimum of two weeks to engage in a variety of activities including public lectures, participations in ongoing courses, and collaborative research.

Term Ending in 2003
Nye, Bill, science guy
Reno, Janet, attorney

Term Ending in 2005
Meier, Richard, architect
Scolnick, Edward M., biomedical scientist

CENTER FOR APPLIED MATHEMATICS

657 Frank H. T. Rhodes Hall (255–4335)

The Center for Applied Mathematics administers a broadly based interdepartmental graduate program that provides opportunities for study and research over a wide range of the mathematical sciences. Each student develops a solid foundation in analysis, algebra, and methods of applied mathematics. The remainder of the graduate student's program is designed by the student and his or her Special Committee. For detailed information on opportunities for graduate study in applied mathematics, students should contact the director of the Center for Applied Mathematics, 657 Frank H. T. Rhodes Hall.

There is no special undergraduate degree program in applied mathematics. Undergraduate students interested in an application-oriented program in mathematics may select an appropriate program in the Department of Mathematics, the Department of Computer Science, or some department of the College of Engineering.

Graduate students in the center take courses related to their program of study that are offered by various departments. Below are listed selected courses in applied mathematics in the main areas of research interest of the center's members. Detailed descriptions of these courses can be found in the listings of the individual departments.

Selected Applied Mathematics Courses

Basic Graduate Courses in Mathematics and Applied Mathematics
MATH 413–414 Honors Introduction to Analysis
MATH 433–434 Honors Introduction to Algebra
MATH 436 Applications of Abstract Algebra
MATH 611–612 Real and Complex Analysis
MATH 615–616 Mathematical Methods in Physics
MATH 621 Measure Theory and Lebesgue Integration
MATH 622 Applied Functional Analysis
MATH 631–632, 634 Algebra
MATH 651 Introductory Algebraic Topology
MATH 661 Geometric Topology
T&AM 612–613 Methods of Applied Mathematics

Analysis (and Differential Equations)
MATH 427 Introduction to Ordinary Differential Equations
MATH 428 Introduction to Partial Differential Equations
MATH 617 Dynamical Systems
MATH 618 Smooth Ergodic Theory
MATH 619–620 Partial Differential Equations
MATH 652–653 Differentiable Manifolds
Math 662 Riemannian Geometry
MATH 711–712 Seminar in Analysis
MATH 713 Functional Analysis
MATH 715 Fourier Analysis
MATH 722 Topics in Complex Analysis
MATH 728 Seminar in Partial Differential Equations

Logic and Theory of Computing
CS 618 Principles of Distributed Computing
CS 671 Introduction to Automated Reasoning
CS 677 Reasoning about Uncertainty
CS 682 Theory of Computing
CS 715 Seminar in Programming Refinement Logics
MATH 486 Applied Logic (also CS 486)
MATH 681 Logic
MATH 781–782 Seminar in Logic
MATH 783 Model Theory
MATH 784 Recursion Theory
MATH 785 Automata Theory
MATH 787 Set Theory
MATH 788 Topics in Applied Logic

Numerical Mathematics and Operations Research
CS 522 Computational Tools and Methods for Finance
CS 621 Matrix Computations
CS 622 Numerical Optimization and Nonlinear Algebraic Equations
CS 624 Numerical Solution of Differential Equations
CS 664 Machine Vision
CS 681 Analysis of Algorithms
CS 722 Topics in Numerical Analysis
CS 729 Seminar in Numerical Analysis
EE 423 Computer Methods in Digital Signal Processing
MATH 425 Numerical Solution of Differential Equations
MATH 728 Seminar in Partial Differential Equations
OR&IE 625 Scheduling Theory
OR&IE 630 Mathematical Programming
OR&IE 632 Nonlinear Programming
OR&IE 635 Interior-Point Methods for Mathematical Programming

Discrete Mathematics and Geometry
MATH 441–442 Introduction to Combinatorics
MATH 455 Applicable Geometry
OR&IE 633 Graph Theory and Network Flows
OR&IE 636 Integer Programming
OR&IE 639 Polyhedral Convexity

Information Communication and Control Theory
EE 411 Random Signals in Communications and Signal Processing
EE 425 Digital Signal Processing
EE 467–468 Telecommunication Systems I and II
EE 471 Feedback Control Systems (also Cheme 472 and MAE 478)
EE 521 Theory of Linear Systems
EE 522 Theory of Nonlinear Systems
EE 525 Adaptive Filtering in Communication Systems
EE 526 Signal Representation and Modeling
EE 561 Error-Control Codes
EE 562 Fundamental Information Theory
EE 563 Communication Networks
EE 565 Statistical Signal Processing
EE 567 Topics in Digital Communication
EE 577 Feed Forward Neural Networks
MAE 677 Robust and Optimal Control

Mathematical Biology
BTRY 451 Mathematical Modeling of Populations
BTRY 662 Mathematical Ecology (also STBTRY 662)
BIO M 697 Individual Graduate Study in Biometry and Statistics

Mathematical Economics

ECON 619 Econometrics I
ECON 620 Econometrics II
ECON 710 Stochastic Economics: Concepts and Techniques
ECON 717–718 Mathematical Economics
ECON 719–720 Advanced Topics in Econometrics

Mechanics and Dynamics

CHEM E 731 Advanced Fluid Mechanics and Heat Transfer
CHEM E 732 Diffusion and Mass Transfer
CHEM E 751 Mathematical Methods of Chemical Engineering Analysis
CHEM E 753 Applied Analysis of Nonlinear Systems: Stability, Bifurcation, and Continuation
M&AE 601 Foundations of Fluid Dynamics and Aerodynamics
M&AE 602 Fluid Dynamics at High Reynolds Numbers
M&AE 732 Analysis of Turbulent Flows
M&AE 733 Stability of Fluid Flow
M&AE 734 Turbulence and Turbulent Flow
M&AE 736 Theory of Computational Aerodynamics
M&AE 737 Computational Fluid Mechanics and Heat Transfer
T&AM 570 Intermediate Dynamics
T&AM 578 Nonlinear Dynamics and Chaos
T&AM 666 Finite Element Analysis (also MAE 680 and CEE 772)
T&AM 671 Hamiltonian Dynamics
T&AM 672 Celestial Mechanics (also Astro 579)
T&AM 673 Mechanics of the Solar System (also Astro 571)
T&AM 675 Nonlinear Vibrations
T&AM 678 Complex Systems
T&AM 751 Continuum Mechanics and Thermodynamics
T&AM 752 Nonlinear Elasticity
T&AM 776 Applied Dynamical Systems (also Math 717)

Probability and Statistics

EE 562 Fundamental Information Theory
EE 563 Communication Networks
EE 565 Statistical Signal Processing
EE 566 Wireless Networks
MATH 671–672 Probability Theory
MATH 674 Introduction to Mathematical Statistics
MATH 777–778 Stochastic Processes
OR&IE 561 Queuing Theory and Its Applications
OR&IE 563 Applied Time-Series Analysis
OR&IE 650 Applied Stochastic Processes
OR&IE 651 Probability
OR&IE 662 Advanced Stochastic Processes
OR&IE 670 Statistical Principles
OR&IE 671 Intermediate Applied Statistics
STBTRY 408 Theory of Probability
STBTRY 409 Theory of Statistics

Robotics and Vision

CS 664 Machine Vision
EE 547 Computer Vision
EE 548 Digital Image Processing

Theoretical/Mathematical Physics/Chemistry

CHEM 792 Molecular Collision Theory
CHEM 793 Quantum Mechanics I
CHEM 794 Quantum Mechanics II
CHEM 796 Statistical Mechanics
CHEM 798 Special Topics in Physical Chemistry
EE 407 Quantum Electronics
PHYS 553–554 (ASTRO 509–510) General Relativity
PHYS 561 Classical Electrodynamics
PHYS 562 Statistical Physics
PHYS 572 Quantum Mechanics I
PHYS 574 Quantum Mechanics II
PHYS 651–652 Relativistic Quantum Field Theory

CORNELL CENTER FOR THE ENVIRONMENT

Rice Hall (255–7535)

The Cornell Center for the Environment (CfE) coordinates interdisciplinary research, teaching, and outreach programs on environmental issues. CfE's overarching goal is to continuously advance an intellectual community for the environment at Cornell University, with the objective of promoting a sustainable future. To meet this goal CfE:

- initiates environmental courses and curricula at both the graduate and undergraduate levels;
- facilitates interdisciplinary environmental research;
- coordinates outreach programs that assist federal, state, and local government, international agencies, private organizations, businesses, and individuals;
- organizes environmental events, lectures, festivals, and seminars; and
- serves as a clearinghouse for environmental information.

The CfE web page (www.cfe.cornell.edu) is the principal source of environmental information for Cornell students, faculty, and staff. Check it frequently for the latest updates on funding, seminars, courses, lectures, events, research opportunities, and new educational programs.

EDUCATION

Undergraduates and graduates can study the environment through programs in Cornell departments, centers, and institutes. Cornell has a strong tradition in environmental studies, with over 200 faculty across campus from the natural, biological, and social sciences working on various environmental issues.

Undergraduate Education

For undergraduate students, a listing of environmental course offerings is posted on the CfE web page (www.cfe.cornell.edu) along with a listing of majors for students interested in the environment. Students are also encouraged to review the *Courses of Study* section on "Cornell's Undergraduate Environmental Programs."

Graduate Study

Graduate level environmental concentrations are found in many of Cornell's "Major Fields of Study," from Agricultural and Biological Engineering to Zoology. Similarly, there are opportunities for further study through graduate minors. The Center for the Environment administers several graduate programs, including the Masters Program in Environmental Management, the Environmental Toxicology Graduate Field, and the Conservation and Sustainable Development minor.

Master's Program in Environmental Management (MPS-EM). Resolving complex environmental problems requires more than technological solutions and technical expertise. Environmental professionals also need broad-based administrative, analytical, and managerial skills to make cost effective decisions, perform impact analyses, effectively engage stakeholders, and work in a fluctuating legal, political, and regulatory arena. The MPS-EM Program is organized with these demands in mind.

Students take common core courses including: Science and Technology of Environmental Management (ABEN 425); Managing Local Environmental Systems: Social Perspectives and Research Bases (Rural Sociology 560); Legal Aspects of Environmental Management (CRP 551 or NTRES 408); and Environmental and Resource Economics (ARME 651). An interdisciplinary problem-solving project and 15–18 additional credit hours round out the program. For more information, contact CfE's education coordinator (607–255–7535 or cucfe@cornell.edu).

Environmental Toxicology. CfE is the administrative home of the Environmental Toxicology Graduate Field. The field offers a multidisciplinary science program leading to an M.S. or Ph.D. degree. The three major areas of concentration in the program are cellular and molecular toxicology; food and nutritional toxicology; and ecotoxicology and environmental chemistry. The graduate program prepares students for professional opportunities in academia, industry, private research institutes, and governmental agencies.

Conservation and Sustainable Development Minor (CSD). The minor was formed in response to the challenges facing society to provide for the health, safety, and welfare of people while maintaining the ecological integrity of natural ecosystems and the long-term sustainability of food, forage, and fiber production systems. Solutions to today's conservation and sustainable development problems will continue to elude a single disciplinary approach. These challenges must be met by a new kind of specialist that has holistic perspectives and is capable of working on interdisciplinary research and development teams. Hence, the Conservation and Sustainable Development Minor is oriented to graduate students desiring interdisciplinary approaches to real world problems.

Requirements for the minor include: (1) the CSD core course, Critical Issues in Conservation and Sustainable Development (NTRES 618); (2) at least two electives in subject areas outside the student's primary academic focus; and (3) an interdisciplinary problem-solving research or development project. Elective courses are chosen in consultation with the student's graduate committee that includes one representative from the CSD minor.

BEYOND THE CLASSROOM

Students interested in the environment will find many organizations, resources, and activities beyond the classroom setting, both on campus and in the regional area. CfE sponsors guest lectures and co-hosts conferences with groups from across the campus. In addition, CfE organizes the annual Cornell Environmental Film Festival, the Jill and Ken Iscol Distinguished Environmental Lectures, and the Environmental Career Fair.

RESEARCH AND OUTREACH

CfE is home for several environmental institutes offering students opportunities for study, project work, research, and outreach. These programs are focused on a variety of issues from watershed management to sustainable economic development to environmental risks. CfE programs include:

- Water Resources Institute (WRI)
- Institute for Comparative and Environmental Toxicology (ICET)
- Waste Management Institute (WMI)
- Institute for Resource Information Systems (Cornell IRIS)
- Program on Environment and Community (PEC)
- Program on Breast Cancer and Environmental Risk Factors in New York State (BCERF)
- Work and Environment Initiative (WEI)
- Environmental Inquiry (EI)
- Environmental Risk Analysis Program (ERAP)
- CfE Watersheds Program.

For additional information contact:

Center for the Environment
Cornell University
Rice Hall
Ithaca, NY 14853–5601
Tel: 607/255–7535
Fax: 607/255–0238
Email: cucfe@cornell.edu
Web: www.cfe.cornell.edu
Listserv: Environment-L@cornell.edu

THE MARIO EINAUDI CENTER FOR INTERNATIONAL STUDIES

170 Uris Hall (255–6370)

The Mario Einaudi Center for International Studies, established in 1961 to encourage and support comparative and interdisciplinary research on international subjects, is one of the largest and most diverse centers of its kind in the United States. Currently, it includes four U.S. Department of Education Title VI National Resource Centers and 16 other area, development, topical, and educational programs. More than 500 faculty members voluntarily collaborate in the center's programs with well over 300 graduate students involved directly in its international programs. Undergraduate students may choose concentrations in International Relations, Latin American Studies, Modern European Studies, East Asian Studies, South Asian Studies, or Southeast Asian Studies. (See also Africana Studies and Research Center, Asian Studies, and International Agriculture for related majors and concentrations.)

Cornell's international programs are poised to anticipate and respond to changing global circumstances and perspectives. While some programs offer study of geographic regions, others focus on such topics as international agriculture, nutrition, population, law, planning, politics, rural development economics, and world peace. As programs gain momentum and recognition to attract their own resources, the center applies its resources to new pilot activities that bring faculty and students together across traditional disciplines and departmental boundaries.

Each year the center brings an eminent world leader to campus as the Henry E. and Nancy Horton Bartels World Affairs Fellow to deliver a public lecture, meet with classes, and interact informally with faculty and students. Together with the Peace Studies Program, the center hosts a Current Events Roundtable each June that enables Cornell alumni to join faculty in discussion of key world events.

Besides the educational and research opportunities the Einaudi Center makes available on the Ithaca campus, it also provides foreign study options for undergraduate students through the Cornell Abroad Program. The Center promotes graduate students' overseas field research through an annual competition for travel grants and assistance with other fellowship programs. The Fulbright fellowship program, administered by the center, is available to graduating seniors as well as graduate students. The center also is the administrative home of the International Students and Scholars Office, the principal campus resource serving Cornell's large international community.

Cornell is committed to the study of the global community in all its complexity—through a faculty of preeminent scholars and teachers, outstanding research facilities, instruction in more than 40 languages, and a library system with 2,500,000 volumes related to international and comparative studies.

For additional information on current programs, publications, and courses, contact:

The Mario Einaudi Center for International Studies
Cornell University
170 Uris Hall
Ithaca, NY 14853-7601
USA
Phone: 607–255–6370
FAX: 607–254–5000
www.einaudi.cornell.edu

The Einaudi Center Programs Center Administration:
Ron Herring, director
David Lelyveld, executive director
170 Uris Hall

East Asia Program (formerly China-Japan Program):
Vivienne B. Shue, director
140 Uris Hall

Latin American Studies Program:
Billy Jean Isbell, director
190 Uris Hall

South Asia Program:
Christopher Minkowski, director
170 Uris Hall

Southeast Asia Program:
Thak Chaloemtiarana, director
180 Uris Hall

Institute for African Development:
David Lewis, director
170 Uris Hall

Institute for European Studies:
Davydd Greenwood, director
120 Uris Hall

International Agriculture:
Norman Uphoff, director
B31 Warren Hall

Berger International Legal Studies:
John Barceló, director
309 Myron Taylor Hall

International Political Economy:
Jonathan Kirshner, director
B2 McGraw Hall

Gender and Global Change:
Lourdes Beneriá, director
391 Uris Hall

International Studies in Planning:
Barbara Lynch, director
106 West Sibley Hall

Population and Development Program:
Douglas Gurak, director
200 West Sibley Hall

Comparative Societal Analysis:
Mary Brinton, director
348 Uris Hall

Participatory Action Research:
David Pelletier, director
378 Martha Van Rensselaer Hall

Peace Studies Program:
Barry Strauss, director
130 Uris Hall

Program in International Nutrition:
Jean Pierre Habicht, director
218 Savage Hall

Program on Comparative Economic Development:
Kaushik Basu, director
458 Uris Hall

Cornell International Institute for Food, Agriculture, and Development:
Norman Uphoff, director
B31 Warren Hall

Cornell Food and Nutrition Policy Program
David Sahn, director
308 Savage Hall

Program on International Relations:
Matthew Evangelista, director
160 Uris Hall

Cornell Abroad:
Richard Gaulton, director
474 Uris Hall

International Students and Scholars:
Brendan O'Brien, director
B50 Caldwell Hall

COGNITIVE STUDIES

282 Uris Hall (255–6431) (cogst@cornell.edu)

Cognitive Studies focuses on the nature and representation of knowledge. It approaches the study of perception, action, language, and thinking from several perspectives—theory, experiment, and computation—with the aim of gaining a better understanding of human cognition and the nature of intelligent systems. The comparison between human and artificial intelligence is an important theme, as is the nature of mental representations and their acquisition and use. Cognitive Studies draws primarily from the disciplines of computer science, linguistics, neuroscience, philosophy, and psychology. The field of cognitive studies is primarily represented by faculty in the following departments: Communication, Computer Science, Design and Environmental Analysis, Economics, Education, Human Development, Linguistics, Mathematics, Neurobiology and Behavior, Philosophy,

Psychology, and Sociology, as well as the Johnson Graduate School of Management.

Undergraduate Programs

An undergraduate concentration in cognitive studies in the College of Arts and Sciences provides a framework for the design of structured, individualized programs of study in this growing interdisciplinary field. Such programs of study are intended to serve as complements to intensive course work in a single discipline as represented in an individual department. For further information on the undergraduate program, see "Cognitive Studies Concentration" in the College of Arts and Sciences section. Contact Linda LeVan (255–6431 or cogst@cornell.edu).

Graduate Programs

Cornell offers a graduate field minor in cognitive studies. Cornell's unique program of graduate training, which seeks to tailor an optimal program of study and research for each individual, fosters interdisciplinary committees. It is the norm for students interested in cognitive studies to combine faculty members from such fields as Philosophy, Computer Science, Linguistics, Psychology, or Neurobiology and Behavior on common committees. For further information on the graduate Field of Cognitive Studies, contact Shimon Edelman and Ron Hoy, directors of graduate studies, (255–6365 or 254–4318, se37@cornell.edu or rrh3@cornell.edu), or Linda LeVan, executive staff assistant, 282 Uris Hall, Office of Cognitive Studies (255–6431, cogst@cornell.edu).

Courses

Courses from across the university that are relevant to the Cognitive Studies program are listed in this catalog under Arts and Sciences in the section "Special Programs and Interdisciplinary Studies."

CORNELL ABROAD

474 Uris Hall 607/255–6224, fax 607/255–8700, e-mail: CUAbroad@cornell.edu
web homepage: www.einaudi.cornell.edu/cuabroad

Study abroad is an integral part of a Cornell education. We live in an increasingly global society in which knowledge, resources, and authority transcend national and regional boundaries. To help students develop the knowledge, skills, and attitudes necessary for global citizenship in the twenty-first century, Cornell Abroad offers a wide range of international study opportunities that reflect the fundamental educational goals and objectives of the university. Study abroad is a continuous experience with study on campus, enabling students to make regular progress toward the degree.

Qualified students study abroad through programs administered by Cornell and other American institutions, and by enrolling directly in foreign universities. Among the many study abroad programs available, students select programs with thoughtful planning and apply with the approval of their colleges and faculty advisers. To earn credit for overseas study during the fall and/or spring semester(s), students must apply through Cornell Abroad, whose staff services the planning and application process.

LOCATIONS ABROAD

Cornell students majoring in a broad array of fields in all seven undergraduate colleges regularly study in more than 40 countries. The following list includes programs chosen frequently by students with college approval; those locations preceded by an asterisk (*) are programs run directly by Cornell.

AFRICA

Botswana, Cameroon, Kenya, Madagascar, Tanzania, Uganda: School for International Training;

Ghana: University of Ghana (through the Council of International Educational Exchange, CIEE);

Kenya: Wildlife Management (School for Field Studies);

South Africa: Universities of Cape Town and Natal.

ASIA

China: Chinese University of Hong Kong; *Cornell FALCON for the spring semester or full year at the Inter-University Program for Chinese Language Studies at Tsinghua University, Beijng; Peking, Nanjing and Fudan Universities (CIEE); International Chinese Language Program at National Taiwan University; IES Beijing

India: School for International Training; St. Stephen's College Delhi (through Brown or Rutgers Universities);

Indonesia: Institut Keguruan Dan Ilmu Pendidikan (IKIP) in Malang (CIEE);

Japan: *Kyoto Center for Japanese Studies; various university programs; IES Tokyo;

Korea: Yonsei University;

Nepal: *Cornell-Nepal Study Program (Samyukta Adhyayan Karikam Nepal) at Tribhuvan University;

Thailand: Khon Kaen University (CIEE);

Vietnam: University of Hanoi (CIEE);

AUSTRALIA AND NEW ZEALAND

Australian National University, Canberra; University of Sydney; University of Melbourne; University of New South Wales, Sydney; University of Queensland, Brisbane; University of Western Australia, Perth; School for International Training; Sydney Internship (Boston University); Otago and Lincoln Universities in New Zealand;

EUROPE

Denmark: *Denmark's International Study Program (DIS);

France: *EDUCO (Cornell, Duke, and Emory in Paris) at Université de Paris VII, Paris I, Institut d'Études Politiques de Paris ("Sciences Po"); Critical Studies Program at the University of Paris (CIEE); Paris Internship (Boston University); IES Dijon Business Program

Germany: *Berlin Consortium for German Studies at the Free University of Berlin; Wayne State University in Munich and Freiburg;

Greece: College Year in Athens;

Ireland: Trinity College Dublin and the National University Colleges of Dublin, Galway, and Cork;

Italy: *Cornell College of Art, Architecture, and Planning Program in Rome; Bologna Cooperative Studies Program; Boston University Program in Padova; IES Milan; Intercollegiate Center for Classical Studies in Rome; Syracuse University program in Florence;

Netherlands: University of Amsterdam; Leiden University;

Russia: St. Petersburg University (CIEE); Moscow International University and other universities (American Council of Teachers of Russian);

Spain: *Cornell-Michigan-Penn program at the University of Seville; various language and culture programs;

Sweden: *Swedish Child Care and Family Policy Practicum at the University of Göteborg; The Swedish Program at the University of Stockholm;

United Kingdom: *Direct enrollment at: the University of Birmingham; University of Bristol; Cambridge University; University of East Anglia; University of Edinburgh; University of Glasgow; University of Manchester; Oxford University; University of St. Andrews; University of Sussex; University of Warwick; University of York; University of London: King's College, University College (including the School of Slavonic and East European Studies), Imperial College of Science and Technology, the London School of Economics and Political Science, and the School of Oriental and African Studies, as well as other universities of choice.

Externally sponsored programs in the UK include the British American Drama Academy, the Beaver College, Boston, and Rochester University internships, the Marymount College Program at the London College of Fashion, and the Hansard Parliamentary Internship Programme.

Students studying in the United Kingdom enjoy a variety of services, and cultural activities, provided by the Cornell-Brown-Penn UK Centre in London.

LATIN AMERICA, CENTRAL AMERICA, AND THE CARIBBEAN

Argentina and Chile: various university-based study abroad programs, through the Cooperating Programs in the Americas (COPA) of Butler University and the University of Illinois;

Belize, Brazil, Chile, Ecuador: School for International Training;

Costa Rica: Organization for Tropical Studies (OTS) Undergraduate Semester Abroad in tropical biology; School for Field Study; Universidad National (Heredía);

Cuba: the University of Havana through COPA; School for International Training;

Ecuador and Jamaica: Partnership for Service Learning;

Honduras: Escuela Agrícola Panamericana (Zamorano);

Mexico: Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM); Universidad de las Americas-Puebla (UDLA); Universidad Iberoamericana; School for Field Studies in Baja California;

MIDDLE EAST AND NORTH AFRICA

Egypt: American University in Cairo;

Israel: Ben-Gurion University; Haifa University; Hebrew University of Jerusalem; Tel Aviv University;

Jordan: University of Jordan (CIEE);

Morocco: School for International Training

Other Locations

Cornell students are by no means limited to the locations listed above or to the programs identified for particular countries. In recent years, they have also studied in Austria, Croatia, Czech Republic, Dominican Republic, Finland, the Philippines, Poland, Portugal, Switzerland, Turkey, Venezuela, and elsewhere.

Who Studies Abroad

Students from all seven undergraduate colleges and from all major fields study abroad; they are generally expected to have a cumulative grade point average of 3.0 or above. More than 500 undergraduates studied abroad last year. Because the colleges usually require that students complete at least 60 hours of undergraduate credit on the Ithaca campus, students who transfer to Cornell as juniors are usually unable to count study abroad credit toward their Cornell degree.

When Students Study Abroad and for How Long

Students may study abroad their sophomore, junior, or senior year. Junior year is the traditional choice, but second semester sophomore year or first semester senior year is increasingly popular. To ensure preparation, it is important to begin planning for study abroad in the freshman year. Although semester-long programs are usually available, academic year programs are highly recommended.

Application Process

Applications for all study abroad programs—Cornell programs, as well as those administered externally by other institutions—are available at Cornell Abroad, 474 Uris Hall, where students are encouraged to consult the library of study abroad materials, talk with staff, and attend information meetings. The Cornell Abroad web site is a good place to browse through program offerings and to explore links to universities and programs worldwide. Students meet with the study abroad advisers in their colleges to discuss how they will meet college degree requirements. Each applicant completes a written statement of academic purpose outlining goals for study abroad and the program of study that will be followed. Applications are signed by both the faculty adviser and the college study abroad adviser. Arts and Sciences, Human Ecology, and Industrial and Labor Relations students submit applications to their college for forwarding to Cornell Abroad; Agriculture and Life Sciences, Architecture, Art, and Planning, Engineering and Hotel Administration students submit applications directly to Cornell Abroad. Cornell Abroad reviews all applications and forwards them to programs and universities as necessary. *All students who wish to receive academic credit for study abroad must apply through Cornell Abroad and their undergraduate college.*

The application *deadline* for study abroad in the fall 2002 semester and the 2002–2003 academic year is February 15, 2002, for all programs *except* Oxford and Cambridge, for which the deadline to study at those universities for the full year in 2002–2003 is November 1. Many universities and programs admit on a rolling basis before and after these dates. Students planning to study abroad in the spring semester should initiate the application process during the preceding spring. Early application may improve your chances of admission. In all cases, it is a good idea to check with Cornell Abroad.

Registration, Credit Transfer, and Grades

Students who apply through Cornell Abroad to programs approved by their colleges, as outlined above, remain registered at Cornell during study abroad. They are eligible for financial aid and receive full academic credit for pre-approved courses of study completed with satisfactory grades. Students enroll for a full load of courses abroad, according to the standards of the institution or program overseas, and normally receive 30 credits per year, or 12 to 20 credits per semester. The colleges review coursework taken abroad and make the final decisions concerning credit transfer and distribution. When study abroad credit has been transferred, the *transcript* will indicate the names of the courses taken, the grades received, and the total credits earned for each semester. *The foreign grades are not translated into the Cornell/American grading system, nor are they averaged into the Cornell grade point average.*

Foreign Language Requirements

Study abroad programs in non-English–speaking countries that offer direct enrollment in universities generally require at least two years, or the equivalent, of college-level language study. Students should make firm plans for any requisite language courses early in their freshman year. English-language study abroad programs are increasingly available in non-English–speaking countries—for example, Belgium, Denmark, Egypt, France, Hong Kong, Indonesia, Italy, Japan, Korea, Netherlands, People's Republic of China, and Sweden. Cornell students who participate in programs in a non-English–speaking country with English-language course work are required to take at least one language course as part of their program of study and are strongly encouraged to take more. Students are advised to consult with their college study abroad advisers about relevant language preparation, and students in the College of Arts and Sciences should note that they are required to have studied the host country language, if taught at Cornell, prior to study abroad.

Housing Arrangements

Study abroad programs generally provide housing in the homes of local residents, in halls of residence for university students, or in rental apartments. Cornell Abroad will advise students of the arrangements that are available and most appropriate to their individual needs.

Costs

Students studying abroad on Cornell programs pay a uniform Cornell Abroad Tuition per semester, which covers tuition, housing, orientation, some field trips, and excursions. Some or all meals may be included also. Cornell Abroad staff are always available to discuss study abroad costs on all programs.

In 2001–2002, The Cornell Abroad Tuition for students participating in the Berlin Consortium for German Studies, the Cornell Nepal Study Program, EDUCO (Emory, Duke and Cornell in Paris), the Michigan-Cornell-Penn Program in Seville, and the Swedish Child Care Practicum at the University of Goteborg is $15,600. For the following affiliate universities in the United Kingdom, the Cornell Abroad tuition is also $15,600: Cambridge and Oxford, St. Andrews, Imperial College, King's College, London School of Economics, School of Oriental and African Studies, and University College London (including the School of Slavonic and East European Studies).

At the following affiliate universities in the United Kingdom, the Cornell Abroad program tuition will be $13,100 per semester: The Universities of Birmingham, Bristol, East Anglia, Glasgow, Manchester, Sussex, Warwick and York. For Denmark's International Studies Program (DIS), the Cornell Abroad program tuition will be $14,800. For the Kyoto Center for Japanese Studies (KCJS) the tuition will be $18,700 per semester.

Students studying abroad on all other programs in 2001–2002 pay the tuitions and other costs charged by their programs, and a Cornell International Program Tuition of $3,600 per semester. The International Program Tuition covers the direct and indirect costs of study abroad to the university, including financial aid for all study abroad students.

Financial Aid

Students who are accepted for study abroad during the academic year or semester, having applied through Cornell Abroad, are eligible for two semesters of financial aid, consistent with general university aid policy; this applies to all programs, whether run directly by Cornell or not. Students who have transferred into Cornell with 60 or more credit hours are not likely to receive aid for study abroad assuming they would thereby need more than eight semesters to earn the undergraduate degree. Some programs abroad offer need-based and merit-based scholarships.

Security Abroad and Related Issues

The decision to study in a particular region of the world must be made by each student and his or her family in light of their own interpretation of current events. The director, associate director, and staff stay in regular contact with representatives abroad and receive information regarding rapidly changing political situations worldwide through the U.S. Department of State Office of

Citizens Emergency Services and other agencies. As long as the State Department does not restrict travel by U.S. citizens, Cornell Abroad does not recommend limitations on student plans for study abroad. Cornell Abroad will do everything possible to notify students immediately that they should defer plans when official travel restrictions are issued. Nothing is as important as student security and well-being.

Responsibility for a decision to withdraw from a program or return home early rests with the individual and his or her family. There can be no guarantee of credit for students who withdraw from programs sponsored by colleges and universities other than Cornell; they are advised to inquire about those institutions' policies regarding the completion of academic work and the potential financial implications of a premature departure. In the event of a disrupted semester, refunds of tuition and fees, and the appropriate number of credits to be awarded will be reviewed by Cornell and affiliated institutions on a case-by-case basis. Most institutions sponsoring study abroad programs strive to facilitate student completion of academic programs even under unusual circumstances and have tuition refund policies based on prorated formulas.

Sources of Information and Advice Concerning Study Abroad

Cornell Abroad (474 Uris Hall): Richard Gaulton Ph.D., director; Beatrice B. Szekely Ph.D., associate director; Libby Okihiro, student services coordinator; Kathy Lynch, financial services coordinator. The Cornell Abroad library contains an extensive collection of university catalogs and study abroad program brochures, files of course syllabi and evaluations, books, videotapes, and some information on travel, summer study, and work abroad. Comprehensive information is provided on the Cornell Abroad web site which incorporates linkages to universities, programs, and resources worldwide. In the early weeks of every semester, faculty, students, and staff discuss programs in a series of information meetings announced in the Cornell Daily Sun and on the Cornell Abroad web homepage (www.einaudi.cornell.edu/cuabroad).

College Study Abroad Advisers

Agriculture and Life Sciences: Bonnie Shelley, 140 Roberts Hall; *Architecture, Art, and Planning:* Jane Worden, 129 Sibley; *Arts and Sciences:* Dean Pat Wasyliw, 55 Goldwin Smith Hall; *Engineering:* Dan Maloney Hahn and Tammy Bennington, 167 Olin Hall; *Hotel Administration:* Cheryl Farrell, 174B Statler Hall; *Human Ecology:* Paul Fisher, 172 Martha Van Rensselaer; *Industrial and Labor Relations:* Laura Lewis, 101 Ives Hall.

CORNELL-IN-WASHINGTON PROGRAM

311 Caldwell Hall (255–4090)

Cornell-in-Washington is a program that offers students from all colleges in the university an opportunity to earn full academic credit for a semester of study in Washington, D.C. The aim of the program is to give students a chance to take advantage of the rich resources of the national capital. Washington, as the center of much of the nation's political energy, is an ideal place to study American public policy and the institutions and processes through which it is formulated and implemented. At the same time, Washington's rich collection of libraries, museums, theaters, and art galleries, offers an opportunity to explore American history, literature, art, and the full range of the American humanistic tradition. The Cornell-in-Washington Program offers two study options: (1) studies in public policy; and (2) studies in the American experience. Students take courses from Cornell faculty, conduct individual research projects, and work as externs in the Washington community.

The program is housed at the Cornell Center, 2148 O Street, NW, Washington, D.C. 20037. The academic and adminstrative space is located on the first floor and 27 residential units for approximately 60 students and faculty are on the upper floors.

The Cornell-in-Washington program is open to qualified juniors and seniors from all colleges, schools, and divisions of the university. Students enroll in one core course, which involves a major research project often carried out in conjunction with an externship. Students also select one or two other seminars from such fields as government, history, economics, history of art, and social policy. All seminars are taught by Cornell faculty and carry appropriate credit toward fulfillment of major, distribution, and other academic requirements. In addition, students work as externs with congressional committee offices, executive-branch agencies, interest groups, arts and research institutions, and other organizations involved in public policy and American culture.

Tuition

Students are registered as full-time students, earn Cornell credit, pay full tuition, and remain eligible for financial aid.

Housing

Apartments are rented at the Cornell Center during the academic year. All are fully furnished (except for dishes, cookware, towels and bedding) and reasonably priced by both Washington and Cornell standards. Two students are assigned to each efficiency and three to each one-bedroom apartment. Because of the limited number of spaces and the need for accurate planning, a non-refundable deposit of $150 is required to reserve a space. Students are discouraged from bringing automobiles. The public transportation system, consisting of both bus and subway service, is extensive and convenient to the Center and street parking is not available.

Applications

Application forms are available from the Cornell-in-Washington office at 311 Caldwell Hall. Applications should be submitted the semester prior to participation.

Information

The Cornell-in-Washington website is located at ciw.cornell.edu. Regular information meetings are held on campus in early October and March. These meetings are advertised in the *Cornell Daily Sun* and on campus bulletin boards. Additional information concerning externships, courses, housing and other features of the program may be obtained at either the Cornell-in-Washington office at 311 Caldwell Hall (607) 255–4090, or in Washington at the Cornell Center, 2148 O Street, NW, Washington, DC 20037, (202) 466–2184.

CORNELL INSTITUTE FOR PUBLIC AFFAIRS

473 Hollister Hall (255–8018)

The Cornell Institute for Public Affairs (CIPA) is a university-wide institute that offers a two-year graduate professional program leading to a Master of Public Administration. Our mission is to develop professionals who can be effective, ethical, and creative leaders in government and in the private sector's interface with government.

CIPA emphasizes the interactions between public and private interests for the benefit of all sectors of society. At CIPA, we utilize Cornell's cutting-edge strengths as a major research university to understand rapidly evolving public interests, technological opportunities, ecological constraints, individual aspirations, and political possibilities. Examples of Cornell's extraordinary breadth of policy-related specialties include science and technology; health, education, and social services administration; agricultural, food, and nutrition policy; international development; environmental studies; peace studies; labor relations; city and regional planning; and ethics in public life. These areas of expertise provide a diverse base for the CIPA Fellows (our students) to pursue the study of public affairs. Thus, CIPA Fellows take courses and work with faculty from all of Cornell's Colleges as well as the Cornell Law School, with whom a joint M.P.A./J.D. degree is offered, and the Johnson Graduate School of Management.

The CIPA program has been developed to offer both a sound foundation in the principles, tools and techniques for a career and leadership in public policy either in the public or private sector. CIPA also offers the flexibility to accommodate and encourage the specialized policy-related interests of our students.

The two-year curriculum is structured into three parts: five interdisciplinary core courses taken by all CIPA Fellows; "competency" area requirements to develop the wide variety of skills and professional perspectives necessary for the practice of public policy; and sectoral specialization through additional courses and the completion of a thesis in the area of the fellow's policy focus.

The Core Courses

These courses have been developed specially for CIPA Fellows to provide a common, hands-on experience in employing the latest analytical techniques to guide the formulation of programs, their supporting institutions, and their effective administration. They will also provide strategies for implementing change in complex heterogeneous societies.

CIPA I: Quantitative Techniques for Policy Analysis and Program Management (CRP 621)

Provides students with the basic management tools essential for the contemporary career in public affairs. It includes hands-on practice with formal management techniques,

including investment analysis and linear and dynamic programming.

CIPA II: Public Political Economy (ECON 539) Uses techniques of economic analysis to understand the need for various public programs, to estimate the value of new programs and policies, to forge desirable institutional structures for service delivery, and to anticipate and evaluate outcomes.

CIPA III: Administration, Politics, and Public Affairs (GOVT 621) Explores the processes and institutional context of public affairs and analyzes the political and administrative structure and dynamics of policy development and implementation.

CIPA IV: Social Policy (526) Integrates a variety of analytic methods, especially statistics and simulation models, to explore the structure of public programs and to assess their direct and indirect consequences.

CIPA V: Models and Quantitative Methods (CRP 528) Demonstrates the use and limits of models and quantitative techniques in forming and administering policy.

The Area Requirements

In addition to the five core courses, fellows must also complete satisfactorily a series of foundation subject or "competency" area requirements that are essential to the training of public policy professionals. These competency areas are: administration, politics, and policy; economics; math and statistics; finance; regulation; and ethics and public law.

The Sectoral Specialty

At least three courses taken by individual fellows will be in their sectoral specialty or "concentrations." These are widely divergent and depend on the unique interests and background of the individual student.

The CIPA Thesis

Each fellow must complete a thesis, which applies the conceptual tools, theories, and analytical techniques to a problem in the fellow's area of sectoral expertise. As the culmination of each M.P.A. course of study, this thesis must be both critical and creative, reflecting the fellow's ability to identify, analyze, and generate supportable solutions to important public policy questions.

Additional Requirements

All M.P.A. candidates must spend four semesters in residence to complete the degree.

The Faculty

In addition to our five core faculty members (Richard E. Schuler, director, economics and civil and environmental engineering; Steven Caldwell, sociology; Arch Dotson, government; David Lewis, city and regional planning; and Peter Stein, physics) who offer the five core courses and advise the fellows in the development of their programs of study, over 100 faculty members at Cornell participate in the graduate field of public affairs and policy. All field faculty members are available to supervise the theses of individual Fellows whose policy interests coincide with faculty expertise.

Special Programs

The combined four-year M.P.A./J.D. and M.P.A./M.B.A. degree programs are available for interested applicants. For selected Cornell undergraduates who are accepted by the end of their junior year, a combined five-year bachelor's/M.P.A. program can be arranged.

Student Organization

The Cornell Public Affairs Society, governed by the fellows, conducts a weekly colloquium with guest speakers, a bi-weekly television program, "Point-Of-View", aired on the local public access channel, and publishes, edits, and sponsors student authors for its annual public policy journal, "The Current," as well as arranging regular social events.

Application. Applicants are required to submit GRE general test scores. CIPA has a policy of rolling admissions. Students requesting aid, however, must submit applications by February 15 for consideration. For an application or more information, contact Cornell Institute for Public Affairs, 472 Hollister Hall (phone: 607 255–8018; fax: 607 255–5240; e-mail: cipa@cornell.edu; web site: www.cipa.cornell.edu).

Financial Support. As a professional program, the financial aid resources of CIPA are extremely limited. Students of unusual merit and documented need will be considered for support, but CIPA is unable to provide any one student full support. Therefore, applicants are encouraged to explore and take advantage of all available sources of external funding.

For an application or more information, contact Cornell Institute for Public Affairs, 472 Hollister Hall (phone: 607–255–8018; fax: 607–255–5240; e-mail: cipa@cornell.edu).

CORNELL PLANTATIONS

One Plantations Road (255–3020)
Internet homepage: www.plantations.cornell.edu
e-mail: plantations@cornell.edu

A place of exceptional diversity and learning opportunities, Cornell Plantations comprises the university's botanical garden, arboretum, and natural areas. Its 3,000+ acres include the woodlands and gorges on and around campus, as well as specialized gardens and a 150-acre arboretum that features a field flower meadow and trees and shrubs hardy in central New York State. Cornell Plantations provides unique outdoor laboratories and plant collections for Cornell's academic programs and research in disciplines such as ecology and systematics, floriculture, ornamental horticulture, and bioengineering. While many of Cornell Plantations' resources are on or near campus, several thousand acres in and around Tompkins County preserve quality examples of native vegetation and rare plants and animals. The lands include bogs, fens, glens, swamps, wet and dry forests, vernal ponds, and meadows. Arrangements to use these areas for classes and research can be made by calling Cornell Plantations.

Cornell Plantations also offers relaxation, rejuvenation, and inspiration. The vast open spaces provide room to breathe; while the intimate gardens provide respite from the busy campus. Visitors always discover surprises and learn something new in the gardens, which feature herbs, flowers, vegetables, international crops, rock garden plants, peonies, poisonous plants, ground covers, rhododendrons, wildflowers, and a winter garden.

Students are encouraged to volunteer as photographers, tour guides, computer assistants, gardeners and writers for our magazine and newsletter. A number of student internships are also offered each summer. Maps, information, publications, and class brochures (for noncredit classes and workshops) are available in the Garden Gift Shop in the Lewis Headquarters Building at the botanical garden. Noncredit courses in horticulture, landscape design, botanical arts, and natural history are offered throughout the year. A one-credit seminar series (HORT 480) is offered each fall; a three-credit Public Garden Management course, (HORT 485) is offered every other spring semester.

PROGRAM ON ETHICS & PUBLIC LIFE

240 Goldwin Smith Hall (255–8515)

The critical issues of public life are inescapably ethical issues. In the economy, we face questions of equity and justice and questions about the relation between prosperity, the environment, and the quality of individual lives. In constitutional law, we confront dilemmas about civil rights, freedom of speech, privacy, and abortion. In politics and government, we wrestle with questions about campaigning, character, and compromise. And in international affairs, we encounter the complexities of war and peace, human rights, multilateral aid, and climate change.

The university-wide Program on Ethics & Public Life (EPL) is Cornell's initiative in the systematic study of the ethical dimension of specific public issues. EPL grew out of a conviction that these questions need something more than abstract philosophical discussion. In addition to the general study of values and principles that goes on in theoretical ethics, universities need to foster ways of thinking about the complex, uncertain, and urgent problems of the real world, ways of thinking that are realistic without sacrificing their ethical character.

EPL does not intend to create either an undergraduate major or a graduate field in Ethics & Public Life. On the contrary, we seek to enhance and facilitate the discussion of ethical issues by students whose central educational interests lie elsewhere, but whose work and lives will nevertheless confront them with dilemmas and responsibilities for which a university education should prepare them. EPL aims to enrich existing departments with courses that are intellectually and practically fruitful at the same time. It offers a concentration in Law and Society (see separate listing under "Special Programs and Interdisciplinary Studies").

EPL Core Courses

PHIL 194/GOVT 294 Global Thinking
PHIL 242/GOVT 260 Social and Political Philosophy
PHIL 246 Ethics and the World Environment
PHIL 247 Ethics and Public Life
PHIL 294/GOVT 294 Global Thinking
PHIL 342 Law, Society, and Morality
PHIL 343 Political Obligation and Civil Disobedience
GOVT 469/PHIL 369 Limiting War: The Morality of Modern State Violence
GOVT 412 Voting and Political Participation
GOVT 466/WOMNS 466/LAW 648 Feminism and Gender Discrimination
GOVT 468/PHIL 368 Global Climate and Global Justice

GOVT 491/691 Normative Elements of International Relations

Related Courses

AN SC 414 Ethics and Animal Science
B&SOC 206/S&TS 206 Ethics and the Environment
CEH 356 Economics of Welfare Policy
CRP 549 Ethics and Practical Judgment in Planning Practice
ENGR 360/S&TS 360 Engineering Ethics
GOVT 474/PHIL 446 Topics in Social and Political Philosophy
HSS 658 Ethics, Public Policy, and American Society
ILRHR 366 Women at Work
ILRCB 401 My Brother's Keeper
ILRCB 482 Ethics at Work
ILRCB 488 Liberty and Justice For All
ILRCB 604 Theories of Equality and Their Application in the Workplace
LAW 655 International Human Rights
LAW 667 Law and Ethics of Lawyering
LAW 718 Ethnic Conflict and International Law
NBA 578 Business Ethics
NTRES 407 Religion, Ethics, and the Environment
NTRES 411 Seminar in Environmental Ethics
PHIL 145 Contemporary Moral Issues
PHIL 241 Ethics
PHIL 245 Ethics and Health Care
PHIL 246 Ethics and the Environment
PHIL 341 Ethical Theory
PHIL 344 History of Ethics: Ancient and Medieval
PHIL 345 History of Ethics: Modern
PHIL 346 Modern Political Philosophy

Michele M. Moody-Adams, director, 240 Goldwin Smith Hall, 255–8515; Michele M. Moody-Adams, Wyn and William Y. Hutchinson Professor of Ethics & Public Life and Professor of Philosophy; Henry Shue, Professor of Ethics & Public Life and Professor of Philosophy; Kathryn Abrams, Professor of Ethics & Public Life and Professor of Law.

PROGRAM IN REAL ESTATE

114 West Sibley Hall (255–7110)

The two-year Master of Professional Studies (M.P.S.) degree in Real Estate is an interdisciplinary degree program that combines courses from nearly every college at Cornell University. The degree is designed for aspiring real estate professionals who are in the initial or early stages of their careers. Two entities provide support for the degree program. The *Program in Real Estate* exists at Cornell University to serve as the integrating organizational unit for financial management and administration of academic real estate activities on and off campus. The *Field of Real Estate* is a committee of faculty members from several different colleges that is directly involved in the design and administration of the real estate curriculum.

The professional study of real estate is concerned with the finance, exchange, development, management, marketing, and many other aspects of the real estate business. Real estate professionals also bring an understanding of the long-range social, political, ethical, and environmental implications of decisions about real estate. The 62 credit hours of course work needed to earn the degree provide a comprehensive and lasting foundation for professional careers in real estate.

Students take core courses in principles of real estate, real estate development process, real estate finance and investment, managerial finance, residential development, real estate law, construction planning and operations, and real estate marketing and management, along with weekly industry seminars and elective courses in their chosen areas of concentration. Many concentration options are possible and may be structured from the hundreds of related courses taught at Cornell University (e.g., development, finance, investments, real estate consulting, substainable development, property and asset management, real estate marketing and market analysis or international real estate concentrations). Students complete a real-world, semester long project workshop during their final semester.

Admissions

Admissions procedures for the M.P.S. (Real Estate) program are supervised by the Graduate School and Real Estate Field. Applicants to the program must have completed a bachelor's degree with a good academic record. They must achieve Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) scores that are at the level required in other Cornell graduate professional degree programs; and at least two letters of recommendation from undergraduate college faculty members (and if appropriate, from employers) familiar with the student's academic and professional work must be submitted. There is no work experience requirement for admission (although work experience is preferred). Foreign students, for whom English is a second language, will need to achieve acceptable TOEFL scores.

For more information, contact C. Bradley Olson, director of the Program in Real Estate (607–255–7110) or e-mail real_estate@cornell.edu.

SCIENCE OF EARTH SYSTEMS: AN INTERCOLLEGE MAJOR

During the past several decades, with the increasing concern about air and water pollution, nuclear waste disposal, the ozone hole, and global climate change, the scientific community has gained considerable insight into how the biosphere, hydrosphere, atmosphere, and lithosphere systems interact. It has become evident that we cannot understand and solve environmental problems by studying these individual systems in isolation. The interconnectedness of these systems is a fundamental attribute of the Earth system, and understanding their various interactions is crucial for understanding our environment.

The Science of Earth Systems (SES) major emphasizes the rigorous and objective study of the Earth system as one of the outstanding intellectual challenges of modern science and as the necessary foundation for the future management of our home planet. In this program, Cornell's strengths across a broad range of earth and environmental sciences have been coalesced to provide students with the tools to engage in what will be the primary challenge of the twenty-first century.

Graduates of Cornell's SES program are well prepared for several career and advanced study options:

- Graduate work leading to the M.S. and/or Ph.D. in any of the earth science subdisciplines (e.g., atmospheric science, geology/geophysics, biogeochemistry, hydrology, oceanography).
- Employment in environmentally-oriented careers in both the private and public sector at the B.S. or B.A. level.
- Advanced degree in environmental law or policy. These fields value students with an understanding of the science behind legal and policy decisions.
- Advanced degree in teaching, for example, earth science at the middle or high school level.
- Medical school. The emphasis on basic sciences in the SES curriculum makes the SES major a suitable springboard for a career in medicine.

The SES major is available for students in the College of Agriculture and Life Sciences and the College of Arts and Sciences. In the College of Engineering, the SES curriculum may be completed by choosing the SES option in the Department of Earth and Atmospheric Sciences. The SES major has its home in the Department of Earth and Atmospheric Sciences, but relies on the collaboration of several departments across the university.

The SES Curriculum

The SES curriculum provides strong preparation in mathematics, physics, chemistry, and biology during the freshman and sophomore years. In the junior and senior years, students take a set of common SES core courses and an additional set of advanced disciplinary or interdisciplinary courses that build on the basic sequences.

The requirements for the major are as follows:

(1) Basic Math and Sciences

a. MATH 111 and 112, or MATH 191 and 192, or MATH 190 and 192

b. PHYS 207 and 208, or PHYS 112 and 213, if PHYS 214 will also be taken (see below)

c. CHEM 207 and 208

d. BIO 101/103 and 102/104 (or 105–106) or BIO 109 and 110

e. THREE ADDITIONAL 3–4 credit courses in basic science and math, generally 100- and 200-level classes. At least one of the following must be included in the selection:

EAS 201 Physics and Chemistry of the Earth

BIOEE 261 Ecology and the Environment

Other examples are MATH 293 and MATH 294, biochemistry, organic chemistry, PHYS 214, and introductory statistics. With the exception of an introductory statistics course, the additional basic courses should require at least one of the classes listed in a–d above as a prerequisite.

(2) Science of Earth Systems Core Courses

EAS 302 Evolution of the Earth System

EAS 331/ASTRO 331 Climate Dynamics

EAS 321/NATRES 321 Introduction to Biogeochemistry

(3) Concentration Courses

Four intermediate to advanced-level courses (300-level and up) that build on the core courses and have prerequisites in the "Basic Math and Sciences" courses listed in (1). These classes build depth and provide the student with a specific expertise in some facet of earth system science. Possible areas of concentration include Climate Dynamics, Biogeochemistry, Ecological Systems, Environmental Geology, Ocean Sciences, Environmental Biophysics, Hydrological Systems, and Soil Science

For more information contact Professor Kerry H. Cook, Department of Earth and Atmospheric Science, khc6@cornell.edu and visit the web site: www.geo.cornell.edu/ses/

DEPARTMENT OF STATISTICAL SCIENCE

301 Malott Hall (255–8066)

B. W. Turnbull (chair); M. T. Wells (director of graduate studies); J. A. Bunge (director of professional programs); N. Altman, K. Athreya, T. Berger, G. Casella, C. Castillo-Chavez, M. Contreras, T. DiCiccio, R. Durrett, E. Dynkin, T. Fine, A. Hadi, Y. Hong, J. T. G. Hwang, H. Kesten, N. Kiefer, R. Nielson, M. Nussbaum, P. Protter, S. Resnick, D. Ruppert, G. Samorodnitsky, S. Schwager, R. Strawderman, P. Velleman, T. Vogelsang.

The university-wide Department of Statistical Science at Cornell coordinates activities in statistics and probability at the undergraduate, graduate, and research levels.

Students interested in graduate study in statistics and probability can apply to the Graduate Field of Statistics or to one of the other graduate fields of study that offer related course work. Students in the Field of Statistics plan their graduate program with the assistance of their Special Committee. For detailed information on opportunities for graduate study, students should contact the Director of Graduate Studies, 301 Malott Hall.

The department also offers an undergraduate program through the Biometrics Unit in the College of Agriculture and Life Sciences and an Engineering Statistics minor in the College of Engineering. Undergraduate majors and certificate programs are currently under development for other colleges. For information, contact the Undergraduate Coordinator, (301 Malott Hall, 255–8066). Statistics courses offered by the departments listed below will fill distribution requirements in many of the colleges.

A free consulting service is offered through the Biometrics Unit in the College of Agriculture and Life Sciences. Statistical computing consulting is available through the Office of Statistical Consulting, B21 Savage Hall, 255–1926.

The department is organized into four units; Biometrics, Engineering Statistics, Mathematical Statistics and Probability, and Social Statistics. The areas covered include agricultural statistics, biostatistics, economic and social statistics, epidemiology, manufacturing statistics, quality control and reliability, probability theory, sampling theory, statistical computing, statistical design, statistical theory, and stochastic processes and their applications.

Course designations

The following course identifiers are used to designate the courses offered by the separate units: Biometrics Unit (CALS), STBTRY; Engineering Statistics Unit (ENGR), STENGR; Mathematical Statistics Unit (ARTS), STMATH; Social Statistics Unit (ILR), STSOC. To enroll in one of the courses, see the listing for the appropriate college.

Descriptions of undergraduate and graduate courses are listed below.

Department of Statistical Science

ST 501–502 Applied Statistical Analysis

This is the two-semester core course for students in the Master of Professional Studies (M.P.S.) degree program in applied statistics in the Department of Statistical Science. Enrollment is limited to students enrolled in the M.P.S. program. The course consists of a series of modules on various topics in applied statistics. Some modules will include guest lectures from practitioners. Parallel with the course, students complete a year-long, in-depth data analysis project.

ST 501: Applied Statistical Analysis. Letter only. Topics include, but are not limited to: statistical computing systems, statistical software packages, data management, statistical graphics, and simulation methods and algorithms.

ST 502: Applied Statistical Analysis. Letter only. Topics include, but are not limited to: sample surveys and questionnaire design, data sources, experimental design, and data mining.

Biometrics Unit

STBTRY 100 Statistics and the World We Live In (enroll in BTRY 100)
STBTRY 261 Statistical Methods I (enroll in BTRY 261)
STBTRY 302 Statistical Methods II (enroll in BTRY 302)
STBTRY 400 Biometry Seminar (enroll in BTRY 400)
STBTRY 408 Theory of Probability (enroll in BTRY 408)
STBTRY 409 Theory of Statistics (enroll in BTRY 409)
STBTRY 494 Undergraduate Special Topics in Biometry and Statistics (enroll in BTRY 494)
STBTRY 495 Statistical Consulting (enroll in BTRY 495)
STBTRY 497 Undergraduate Individual Study in Biometry and Statistics (enroll in BTRY 497)
STBTRY 498 Undergraduate Supervised Teaching (enroll in BTRY 498)
STBTRY 499 Undergraduate Research (enroll in BTRY 499)
STBTRY 600 Statistics Seminar (enroll in BTRY 600)
STBTRY 601 Statistical Methods I (enroll in BTRY 601)
STBTRY 602 Statistical Methods II (enroll in BTRY 602)
[STBTRY 603 Statistical Methods III (enroll in BTRY 603)]
STBTRY 604 Statistical Methods IV: Applied Design (enroll in BTRY 604)
[STBTRY 652 Computationally Intensive. Statistical Inference]
STBTRY 662 Mathematical Ecology (enroll in BTRY 662)
[STBTRY 672 Topics in Environmental Statistics (BTRY 672)]
STBTRY 682 Statistical Methods for Molecular Biology (enroll in BTRY 682)
STBTRY 694 Graduate Special Topics in Biometry and Statistics (enroll in BTRY 694)
STBTRY 697 Individual Graduate Study in Biometry and Statistics (enroll in BTRY 697)
[STBTRY 717 Linear and Generalized Linear Models (enroll in BTRY 717)]
STBTRY 795 Statistical Consulting (enroll in BTRY 795)
STBTRY 798 Graduate Supervised Teaching (enroll in BTRY 798)

Engineering Statistics Unit

STENGR 270 Basic Engineering Probability and Statistics (enroll in ENGRD 270)
STENGR 310 Introduction to Probability and Random Signals (enroll in ELE E 310)
STENGR 360 Engineering Probability and Statistics II (enroll in OR&IE 360)
STENGR 361 Introductory Engineering Stochastic Processes I (enroll in OR&IE 361)
STENGR 411 Random Signals in Communications and Signal Processing (enroll in ELE E 411)
STENGR 467 Telecommunication Systems I (enroll in ELE E 467)
STENGR 473 Empirical Research Methods in Financial Engineering (enroll in OR&IE 473)
STENGR 474 Statistical Data Mining (enroll in OR&IE 474)
STENGR 476 Applied Linear Statistical Models (enroll in OR&IE 476)
STENGR 512 Fundamental Information Theory (enroll in ELE E 562)
STENGR 517 Artificial Neural Networks (enroll in ELE E 577)
STENGR 523 Introductory Engineering Stochastic Processes I (enroll in OR&IE 523)
STENGR 560 Engineering Probability and Statistics II (enroll in OR&IE 560)
STENGR 561 Queuing Theory and Its Applications (enroll in OR&IE 561)
STENGR 577 Quality Control (enroll in OR&IE 577)
STENGR 581 Simulation Modeling (enroll in OR&IE 581)
STENGR 582 Simulation Analysis (enroll in OR&IE 582)
STENGR 650 Applied Stochastic Processes (enroll in OR&IE 650)
STENGR 651 Probability (enroll in OR&IE 651)
STENGR 670 Statistical Principles (enroll in OR&IE 670)
STENGR 671 Intermediate Applied Statistics (enroll in OR&IE 671)
STENGR 768 Selected Topics in Applied Probability (enroll in OR&IE 768)
STENGR 769 Selected Topics in Applied Probability (enroll in OR&IE 769)

Mathematical Statistics and Probability Unit

STMATH 171 Statistical Theory and Application in the Real World (enroll in MATH 171)

STMATH 311 Introduction to Analysis (enroll in MATH 311)
STMATH 471 Basic Probability (enroll in MATH 471)
STMATH 472 Statistics (enroll in MATH 472)
STMATH 474 Basic Stochastic Processes (enroll in MATH 474)
STMATH 621 Measure Theory and Lebesgue Integration (enroll in MATH 621)
STMATH 671–672 Probability Theory (enroll in MATH 671–672)
STMATH 674 Introduction to Mathematical Statistics (enroll in MATH 674)
STMATH 771–772 Seminar in Probability and Statistics (enroll in MATH 771–772)
STMATH 774 Asymptotic Statistics (enroll in MATH 774)
STMATH 777–778 Stochastic Processes (enroll in MATH 777–778)

Social Statistics Unit

STSOC 210 Statistical Reasoning I (enroll in ILRST 210)
STSOC 211 Statistical Reasoning II (enroll in ILRST 211)
STSOC 310 Statistical Sampling (enroll in ILRST 310)
STSOC 311 Practical Matrix Algebra (enroll in ILRST 311)
[STSOC 312 Applied Regression Methods (enroll in ILRST 312)]
[STSOC 313 Design and Analysis of Experiments (enroll in ILR 313)]
[STSOC 314 Graphical Methods for Data Analysis (enroll in ILRST 314)]
[STSOC 315 Statistical Analysis of Legal Data (enroll in ILRST 315)]
STSOC 410 Techniques of Multivariate Analysis (enroll in ILRST 410)
STSOC 411 Statistical Analysis of Qualitative Data (enroll in ILRST 411)
STSOC 499 Directed Studies (undergraduate) (enroll in ILRST 499)
STSOC 510 Statistical Methods for the Social Sciences I (enroll in ILRST 510)
STSOC 511 Statistical Methods for the Social Sciences II (enroll in ILRST 511)
[STSOC 610 Seminar in Modern Data Analysis (enroll in ILRST 610)]
[STSOC 611 Statistical Consulting (enroll in ILRST 611)]
STSOC 612 Statistical Classification Methods (enroll in ILRST 612)
[STSOC 613 Bayesian and Conditional Inference (enroll in ILRST 613)]
STSOC 614 Structural Equations with Latent Variables (enroll in ILRST 614)
[STSOC 615 Expert Systems and Probabiljstic Network Models (enroll in ILRST 615)]
STSOC 619 Special Topics in Social Statistics (enroll in ILRST 619)
STSOC 630 Econometrics II (enroll in ECON 620)
STSOC 639 Econometrics I (enroll in ECON 619)
[STSOC 711 Robust Regression Diagnostics (enroll in ILRST 711)]
[STSOC 712 Theory of Sampling (enroll in ILRST 712)]
[STSOC 713 Counting Processes with Statistical Applications (enroll in ILRST 713)]
[STSOC 714 Topics in Modern Statistical Distribution Theory (enroll in ILRST 714)]
[STSOC 715 Likelihood Inference (enroll in ILRST 715)]
[STSOC 716 Statistical Consulting (enroll in ILRST 716)]
[STSOC 717 The Analysis of Discrete Data (enroll in ILRST 717)]
STSOC 730 Advanced Topics in Econometrics II (enroll in ECON 720)
[STSOC 731 Time Series Econometrics (enroll in ECON 721)]
STSOC 739 Advanced Topics in Economics I (enroll in ECON 719)
STSOC 799 Directed Studies (Graduate) (enroll in ILRST 799)

Related Courses in Other Departments

ARME 410 Business Statistics
ARME 411 Introduction to Econometrics
ARME 417 Decision Models for Small and Large Business
ARME 710 Econometrics I
ARME 713 Quantitative Methods I
BTRY 90 Introduction to Biomathematics
BTRY 101 Introduction to Biometry I
BTRY 102 Introduction to Biometry II
BTRY 421 Matrix Computations
BTRY 498 Undergraduate Supervised Teaching
CEE 594 Engineering Management Methods II: Managing Uncertain Systems
CEE 621 Water-Resources Systems II: Stochastic Hydrology
CHEM 794 Quantum Mechanics
CHEM 796 Statistical Mechanics
COM S 522 Computational Tools and Methods for Finance
COM S 624 Numerical Solution of Differential Equations
COM S 626 Computational Molecular Biology
CRP 321 Introduction to Quantitative Methods for the Analysis of Public Policy
CRP 632 Methods of Regional Sciences and Planning I
ECON 321 Applied Econometrics
GOVT 602 Field Seminar in Political Methodology
GOVT 605 Comparative Methods
H ADM 371 Hospitality Quantitative Analysis
HD 401 Empirical Research
NS 637 Epidemiology of Nutrition
NS 639 Epidemiology Seminar
NS 641 Applied Regression
PAM 205 Research Methods
PAM 230 Introduction to Policy Analysis
PAM 423 Risk Management and Policy
PAM 613 Program Evaluation and Research Design
PAM 617 Qualitative Methods for Program Evaluation
PHYS 316 Modern Physics I
PHYS 562 Statistical Physics
PHYS 574 Quantum Mechanics II
PSYCH 472 Multiple Regression
PSYCH 473 General Linear Model
R SOC 619 Research Design II
SOC 502 Basic Problems in Sociology II
SOC 506 Research Methods in Sociology II
T&AM 310 Advanced Engineering Analysis I
T&AM 311 Advanced Engineering Analysis II
VETPMD 665 Study Design

PROGRAM IN COMPARATIVE AND ENVIRONMENTAL TOXICOLOGY

213 Rice Hall (255–8008)

The Cornell Program in Comparative and Environmental Toxicology is a broadly based inter-college program facilitated by the Institute for Comparative and Environmental Toxicology (ICET). ICET serves as a focal point for all research, teaching, and cooperative extension activities in the broad interdisciplinary area of environmental toxicology at Cornell and encourages the development of collaborative programs between faculty members in many university departments.

Graduate Studies

The graduate Field of Environmental Toxicology provides training leading to the M.S. or Ph.D. degrees. There is both breadth and depth in many facets of environmental toxicology and related disciplines. The program offers a combination of research and didactic training that is designed to prepare students for solving the problems of modern toxicology. Concentrations include cellular and molecular toxicology; nutritional and food toxicology; ecotoxicology and environmental chemistry; and a minor concentration of risk assessment, management, and public policy. Research by the faculty associated with the program focuses on the interactions of drugs, pesticides, and other potentially hazardous environmental agents with a wide variety of living organisms (including humans) as well as the ecosystems with which these organisms are associated.

Courses

Courses in environmental toxicology are cosponsored by the university's academic departments and are open to all graduate students and to undergraduates who have permission of the instructor. The titles and numbers of these courses are listed below. Details of course content are provided in the catalog under the listings of the cosponsoring department. Further information concerning the program and the development of new courses may be obtained through the director of graduate studies, 213 Rice Hall, telephone: 255–8008, e-mail: envtox@cornell.edu.; www.cfe.cornell.edu/icet/.

TOX 370 Pesticides and the Environment (ENTOM 370)
TOX 437 Eukaryotic Cell Proliferation (BIO S 437)
TOX 490 Insect Toxicology and Insecticidal Chemistry (ENTOM 690)
TOX 607 Ecotoxicology (Natural Resources 607)
TOX 610 Introductory Chemical and Environmental Toxicology (Natural Resources 610)
TOX 611 Molecular Toxicology
TOX 625 Nutritional Toxicology (Animal Science 625)
TOX 698 Current Topics in Environmental Toxicology (Nutritional Sciences 700, NatRes 698, Ag & Bio Eng 698)
TOX 702 Seminar in Toxicology
TOX 750 Cancer Cell Biology (Biological Sciences 750, Vet. Pathology 750)
TOX 899 Master's Thesis and Research
TOX 999 Doctoral Thesis and Research

CORNELL'S UNDERGRADUATE ENVIRONMENTAL PROGRAMS

Exciting opportunities are available at Cornell University for students interested in environmental study and research. Environmental curricula and courses are found in many parts of the university including the biological, physical, and social sciences, engineering, the humanities, and the design professions. Each of the majors and concentrations/specializations listed below provide opportunities for environmental study. Information can be found in each Department's *Courses of Study*

section, on departmental web pages, or by contacting each department directly. The following information is also available on the Center for the Environment's web page www.cfe.cornell.edu/cfe/education.

College of Agriculture and Life Sciences

- **Agricultural and Biological Engineering** offers environmental study opportunities through a combination of engineering sciences, biology, and applications courses. Within the ABEN major, there are several concentrations including Environmental Systems Engineering and Environmental Systems Technology.
- Within the **Department of Applied Economics and Management** students can select a specialization in Environmental and Resource Economics, which provides training in the application of economic concepts to environmental and resource use problems.
- **Biometry and Statistics** majors learn to use quantitative methods to solve problems in the biological, physical, and social sciences.
- **Communication** offers a curriculum for Communication in the Life Sciences that deals with the impact of communication on environmental, health, science, and agricultural issues, and with public perceptions of risk.
- **Crop and Soil Sciences** provides instruction in four specializations: agronomy, crop science, science of earth systems (see multi-college opportunities below), and soil science. The department also has strong programs in the environmental information sciences including geographic information systems and remote sensing.
- **Earth and Atmospheric Sciences** is a new department that offers majors in atmospheric sciences and geological sciences, as well as the Science of Earth Systems major. Students in the Colleges of Agriculture and Life Sciences, the College of Arts and Sciences, and the College of Engineering can choose from a variety of options, depending on their interests.
- **Entomology** provides students with a basic background in biological and environmental sciences, with a special emphasis on the study of insects.
- **Environmental Science** is a new major in the College of Agriculture and Life Sciences that is pending approval. The proposed major provides an integrative and broad-based program in the physical, biological, and social sciences. The major consists of foundation courses and environmental core courses in earth, biotic, human, and economic systems. Students focus their upper-level study in a concentration or "environmental track," which provides expertise in a particular area. For more information about this new major, contact the Center for the Environment cfe.cornell.edu or (607)255–7535.
- **Landscape Architecture** focuses on the art of landscape design as an expression of cultural values combined with the natural processes of the ambient environment. The program promotes interaction among the areas of horticulture, architecture, and city and regional planning.
- **Natural Resources** has four concentrations that focus on systems that yield renewable natural resources such as wildlife, forests, fish, and water.
- **Plant Sciences** students can specialize in plant biology, plant genetics and breeding, plant pathology, plant protection, or horticultural sciences including floriculture and ornamental horticulture, and fruit and vegetable science.
- **Rural Sociology** is a major that includes interrelated foci: development sociology; population, environment, and society; and applied social data analysis.
- **General Studies** provides opportunities for motivated students—with their faculty adviser—to plan a sequence of courses suited to their individual interests, abilities, and objectives in an area not encompassed by existing programs.

Office of Undergraduate Study in Biological Sciences

- **Biology** majors are enrolled in either the College of Agriculture and Life Sciences or the College of Arts and Sciences. Students can concentrate in a number of areas including biochemistry, ecology and evolutionary biology, marine biology and oceanography, general biology, microbiology, plant biology, plant biotechnology, and systematics and biotic diversity. Students can also enroll in the interdisciplinary Biology and Society major (see "Multi-College Majors" below).

College of Arts and Sciences

- **Chemistry and Chemical Biology** offers a full range of courses in physical, organic, inorganic, analytical, theoretical, bioorganic, and biophysical chemistry.
- **Science and Technology Studies** is a major that focuses on the important roles of science and technology in society. Students select a concentration that draws together a group of related courses. Current concentrations include science, technology, and public policy; technology, culture, and society; environment, science, and society; and history and philosophy of science. Science and Technology Studies also offers the Biology and Society major (see "Multi-College Majors" below).

College of Engineering

- **Civil and Environmental Engineering** offers an accredited undergraduate program in civil engineering and permits students to pursue one of two options leading to a Bachelor of Science degree, one of which is environmental engineering. This option emphasizes study of environmental engineering, water resource systems, and fluid mechanics and hydrology.

College of Architecture, Art, and Planning

- **Urban and Regional Studies** is offered by the Department of City and Regional Planning and is focused on the problems of human communities and regions.

College of Human Ecology

- **Design and Environmental Analysis** is concerned with planning, designing, and managing interior environments to satisfy human needs. The department offers concentrations in interior design, facility planning and management, and human factors and ergonomics.

Multi-College Majors

- **Science of Earth Systems** is designed to educate students across the breadth of the earth sciences without sacrificing the depth of understanding that is needed to face the environmental challenges of the twenty-first century. Students can focus on environmental science, climate dynamics, oceanography, hydrological science, geophysics, and environmental biophysics. The Science of Earth Systems major is open to students in the Colleges of Agriculture and Life Sciences, Engineering, and Arts and Sciences.
- **Biology and Society** is offered as a major by both the College of Arts and Sciences and the College of Human Ecology. Additionally, students in the College of Agriculture and Life Sciences can develop an approved sequence of courses under the College's general studies option. Students in the Biology and Society major combine training in biology with exposure to perspectives from the social sciences and humanities on the social, political, and ethical aspects of modern biology.

Extramural Opportunities

At Cornell, environmental experiences are not limited to classroom work or studies in a major field. There are many other ways to learn about the environment including formal experiences like the Undergraduate Research Programs or environmental courses such as the annual Seminar on Sustainable Development. Another course, Environmental Stewardship in the Cornell Community, was organized by undergraduate students to address new strategies for improving the University's overall environmental performance.

Students can also study abroad in over 40 countries or gain valuable public policy experience by spending a semester in the Cornell-in-Washington program. To enhance their learning experience, students can connect with a variety of campus resources including Cornell Plantations, Laboratory of Ornithology, Agricultural Experiment Station, Center for the Environment, Ecology House, or the Center for Religion, Ethics, and Social Policy.

Opportunities to associate with like-minded student colleagues can be found in many student-run organizations with environmental themes including the Cornell Greens, Cornell Students for Composting, Dillmun Hill Organic Farm, United Progressives, Entomaniax, Cornell Hookbill Association, Wildlife Society, and the International Association of Camel Breeders. Students also publish *Ursus*, a magazine forum for environmental issues at Cornell.

Environmental lectures, seminars, and conferences are a Cornell specialty. At Cornell a student might hear a lecture by one of the University's notable A. D. White Professors-at-Large, which include among others Jane Goodall, international expert on African primates, and William McDonough, a *Time Magazine* "Hero for the Planet." Also, in April of each year, the Jill and Ken Iscol Distinguished Environmental Lecture features a prominent scientist or policymaker.

The surrounding Ithaca community offers Cornellians a range of environmental activities–from outdoor recreation to an organic farmers market to local activism–which most college towns cannot match. Local organizations like EcoVillage at Ithaca, Finger Lakes Land Trust, Cayuga Lake Watershed Network, and the various Finger Lakes State Parks are terrific local resources for the environmentally inclined. The area's unique natural beauty is a haven for outdoor enthusiasts and casual observers of nature.

For more information on Cornell's environmental programs contact:

Center for the Environment
Attn: Education Coordinator
200 Rice Hall
Ithaca, NY 14853
Tel: 607/255–7535
Fax: 607/255–0238
E-mail: cucfe@cornell.edu
www.cfe.cornell.edu.

Business and Preprofessional Study

UNDERGRADUATE BUSINESS STUDY

Undergraduate preparation for business is found in many schools and colleges at Cornell. Students most frequently take courses in more than one area, as well as in related fields, to construct a program to suit their interests and career objectives. Each of the following areas provides a different focus for application and use of business study and training, and students should consider carefully the implications of each program when making a choice. (Graduate study is available in the Johnson Graduate School of Management as well as in graduate fields following each of the undergraduate options.)

The areas most often pursued include applied economics and management (soon to be only the second accredited undergraduate business program in the Ivy League; College of Agriculture and Life Sciences), economics (College of Arts and Sciences), engineering, hotel administration, policy analysis and management (College of Human Ecology), industrial and labor relations, and sociology.

Applied economics and management. This is the undergraduate business degree program at Cornell whose requirements are consistent with the AACSB-International Association for Management Education, the accrediting body for university business programs. Here students gain a general business degree, with courses spanning the fields of marketing, finance, management, accounting, business law, and human resources. Students also participate in specialized programs focusing on entrepreneurship, small business, food industry management, and agribusiness.

Economics. This program provides a broad view of that social science concerned with the description and analysis of the production, distribution, and consumption of goods and services, the understanding of monetary systems, and the comprehension of economic theories and models. It is viewed more often as preprofessional than as training for immediate practice in business or economics.

Engineering. This area provides much of the management personnel of modern industry. Engineers frequently climb the ladders of technological management that lead to more general management responsibilities; more than half of the management-level personnel of major corporations such as General Electric, Xerox, IBM, and Du Pont have engineering degrees. In addition to becoming managers by being effective technical supervisors, many students enter engineering explicitly anticipating graduate business education, judging that an engineering background is particularly appropriate for management in a technology-oriented society.

Hotel administration. The undergraduate program in hotel administration prepares individuals to be mid- to upper-level managers and entrepreneurs for the hospitality industry (lodging, food service, and travel) and allied fields. Instruction is provided in the areas of administration and general management, human-resources management, accounting and financial management, food and beverage management, law, properties management, communication, science and technology, economics, and marketing.

Policy analysis and management. Study in the department develops an understanding of the market economy from both buyers' and sellers' perspectives. The focus is on the economic behavior and welfare of consumers in the private, public, and mixed sectors of the economy. An understanding of economics, sociology, and government policy provides the basis for an analysis of consumers' rights and responsibilities.

Industrial and labor relations focuses on the interactions among human beings, organizations, and institutions. It encompasses not only the relationships between employer and employee but the political, economic, social, and psychological factors that affect those relationships. It includes the study of the hiring, training, and motivating of individual workers; negotiation and conflict resolution; and the economic and technological changes that affect the jobs that people perform. Finally, it embraces the many regulations and regulatory agencies created by our society to protect and help both employer and employed.

Sociology. The program provides disciplined understanding of society and social issues. The insights and analytical skills you will acquire are applicable to corporate, government, and
nonprofit settings, and the department's focus on social organization and institutions will prepare you well for graduate or professional programs in business schools. (Also see the description of the Society and Economy Concentration in the Department of Sociology section of Arts and Sciences.)

Related Areas

Courses in areas directly related to these business programs are found in many of the university departments. For example, quantitative methods may be studied in the departments of Mathematics and Computer Science, and courses in public administration are found in the departments of Government and City and Regional Planning. There are additional programs that allow students with an interest in business to focus on a particular geographic area. Examples are the Latin American Studies Program, the South Asia Program, and the Africana Studies and Research Center. Such interdisciplinary programs as the Program on Science, Technology, and Society and the various programs in international agriculture provide additional opportunities for study of interest to business students.

Combined Degree Programs

Because Cornell has the Samuel Curtis Johnson Graduate School of Management, special opportunities exist for highly qualified undergraduates to combine their undergraduate programs with graduate study in that school. Students in the double-registrant program generally receive a bachelor's degree after four years of study and a Master of Business Administration (M.B.A.) degree after the fifth year of study, rather than the usual sixth year. Students in all Cornell undergraduate colleges and schools are eligible to explore this option. There is also a program with the College of Engineering that allows qualified students to earn a B.S., M.B.A., and Master of Engineering degree in six years. Admission to these combined degree programs is limited to particularly promising applicants. Careful planning is required for successful integration of the work in the two schools.

SELECTED BUSINESS AND MANAGEMENT COURSES

Accounting

AEM 221 Financial Accounting
AEM 323 Managerial Accounting
H ADM 120 Survey of Financial Management
JGSM NBA 500 Intermediate Accounting
JGSM NBA 501 Advanced Accounting
JGSM NBA 505 Auditing
OR&IE 350 Cost Accounting Analysis and Control

Communications

COMM 201 Oral Communication
COMM 204 Effective Listening
COMM 272 Principles of Public Relations and Advertising
COMM 301 Business and Professional Speaking
COMM 372 Advanced Advertising
H ADM 165 Managerial Communication: Writing Principles and Procedures
H ADM 364 Advanced Business Writing

Computing

AEM 412 Introduction to Mathematical Programming
ABEN 204 Introduction to Computer Uses
COMS 100 Introduction to Computer Programming
COMS 101 The Computer Age
COMS 102 Introduction to Microcomputer Applications
EDUC 247 Instructional Applications of the Microcomputer
H ADM 174 Microcomputing

H ADM 374 End-User Business Computing Tools
H ADM 375 Hotel Computing Applications

Economics

AEM 230 International Trade and Finance (also ECON 230)
AEM 250 Environmental Economics
AEM 415 Price Analysis (also ECON 415)
AEM 431 Food and Agricultural Policies
AEM 450 Resource Economics (also ECON 450)
AEM 451 Environmental Economics and Policy (also ECON 409)
AEM 464 Economics of Agricultural Development (also ECON 464)
CEE 321 Microeconomic Analysis
PAM 200 Intermediate Microeconomics
PAM 370 Wealth and Income (cross-listed with CEH 233)
PAM 450 Economics of Health Behavior
ECON 101 Introductory Microeconomics
ECON 102 Introductory Macroeconomics
ECON 314 Intermediate Microeconomic Theory
ECON 317 Intermediate Mathematical Economics I
ECON 318 Intermediate Mathematical Economics II
ECON 351 Industrial Organization
ILRIC 240 Economics of Wages and Employment
ILRIC 340 Economic Security

Entrepreneurship

AEM 325 Personal Enterprise and Small Business Management
AEM 425 Small Business Management Workshop
PAM 424 Families in Business
JGSM NBA 300 Entrepreneurship and Enterprise

Finance

AEM 324 Financial Management
AEM 340 Futures and Options Trading
AEM 404 Advanced Agricultural Finance Seminar
AEM 405 Agricultural Finance
AEM 420 Investments
AEM 429 International Finance
PAM 204 Applied Public Finance
PAM 326 Personal Financial Management (cross-listed with CEH 315)
ECON 331 Money and Credit
ECON 333 Theory and Practice of Asset Markets
ECON 336 Public Finance: Resource Allocation
H ADM 125 Finance
H ADM 226 Financial Management
H ADM 322 Investment Management
H ADM 326 Corporate Finance
OR&IE 451 Economic Analysis of Engineering Systems

International Business

AEM 329 Global Agribusiness Management
AEM 430 International Trade Policy
AEM 449 Global Marketing Strategy
ECON 102 Introductory Macroeconomics
ECON 313 Intermediate Macroeconomics Theory
ECON 325 Economic History of Latin America
ECON 366 The Economy of the Soviet Union
ECON 369 Selected Topics in Socialist Economies: China
ECON 661 International Trade Theory and Policy
ECON 362 International Monetary Theory and Policy

Law, Regulation, and Ethics

AEM 320 Business Law I
AEM 321 Business Law II
AEM 422 Estate Planning
AEM 432 Markets or Governments?
COMM 428 Communication Law
COMM 429 Legal Issues in Business and Electronic Communication
ECON 302 The Impact and Control of Technological Change
ECON 304 Economics and the Law
ECON 308 Economic Analysis of Government (also CEE 322)
ECON 354 Economics of Regulation
ECON 552 Public Regulation of Business
ECON 477 Law and Educational Policy
GOVT 389 International Law
H ADM 422 Taxation and Management Decisions
I&LR 201 Labor Relations Law and Legislation
ILRIC 330 Comparative Industrial Relations Systems: Western Europe
ILRIC 331 Comparative Industrial Relations Systems: Non-Western Countries
PAM 341 Consumer Law & Protection

Management

AEM 220 Introduction to Business Management
AEM 302 Farm Business Management
AEM 328 Innovation and Dynamic Management (also H ADM 418)
AEM 424 Strategic Management
AEM 426 Cooperative Management and Strategies
AEM 427 Advanced Agribusiness Management
AEM 443 Food Industry Management
ECON 326 History of American Business Enterprise
H ADM 103 Principles of Management

Manufacturing

ECON 302 The Impact and Control of Technological Change
OR&IE 410 Industrial Systems Analysis
OR&IE 421 Production Planning and Control

Marketing

AEM 240 Marketing
AEM 344 Consumer Behavior
AEM 346 Dairy Markets and Policy
AEM 347 Strategic Marketing for Horticultural Firms
AEM 448 Food Merchandising
PAM 223 Consumers in the Marketplace I
PAM 323 Consumers in the Marketplace II
H ADM 243 Principles of Marketing

Personnel and Human Resource Management

AEM 326 Human Resource Management in Small Businesses
ECON 381 Economics of Participation and Workers' Management
ECON 382 The Practice and Implementation of Self-Management
H ADM 211 The Management of Human Resources
H ADM 212 Human Relations Skills
H ADM 414 Organizational Behavior and Small-Group Processes
ILROB 120 Introduction to Macro Organizational Behavior and Analysis
ILROB 121 Introduction to Micro Organizational Behavior and Analysis
ILRPR 260 Personnel Management
ILRPR 360 Human Resource Economics and Public Policy
ILROB 370 The Study of Work Motivation
ILROB 373 Organizational Behavior Simulations
ILROB 374 Technology and the Worker
ILROB 420 Group Processes
ILROB 425 Sociology of Industrial Conflict
ILRPR 461 Human Resource Managment (I&LR 200 Collective Bargaining)

Quantitative Decisions and Decision Science

AEM 210 Introductory Statistics
AEM 410 Business Statistics
AEM 411 Introduction to Econometrics
AEM 416 Demographic Analysis in Business and Government (also RSOC 331)
AEM 417 Decision Models for Small and Large Businesses
CEE 304 Uncertainty Analysis in Engineering
CEE 323 Engineering Economics and Management
ECON 320 Introduction to Econometrics
ECON 520 Econometrics II
PAM 340 Economics of Consumer Policy (is cross-listed with CEH 330)
PAM 374 Urban Economics and Policy
ENG 270 Basic Engineering Probability and Statistics

Real Estate

CRP 664 Economics and Financing of Neighborhood Conservation and Preservation
H ADM 323 Hospitality Real Estate Finance
H ADM 350 Real Estate Management

Sociology

SOC 110 Introduction to Economy and Society
SOC 215 Organizations: An Introduction
SOC 222 Social Policy and Organization in Health, Education, and Welfare
SOC 245 Inequality in Industrial Societies
SOC 275 Women at Work
SOC 301 Evaluating Statistical Evidence
SOC 303 Design and Measurement
SOC 340 Health, Behavior, and Health Policy
SOC 345 Gender Inequality
SOC 351 Research Seminar on Organizations
SOC 354 Law and Social Order
SOC 366 Transitions from State Socialism
SOC 370 Different Walks of Life: Sociology of Careers
SOC 426 Social Policy

Transportation

CEE 361 Introduction to Transportation Engineering
CEE 660 Transportation Planning and Policy

PRELAW STUDY

Law schools do not prescribe any particular prelaw program, nor do they require any specific undergraduate courses as do medical schools. Law touches nearly every phase of human activity, and there is practically no subject that cannot be considered of value to the lawyer. Therefore, no undergraduate course of study is totally inappropriate. Students contemplating legal careers should be guided by certain principles, however, when selecting college courses.

1. Interest encourages scholarship, and students will derive the greatest benefit from those studies that stimulate their interest.

2. Of first importance to the lawyer is the ability to express thoughts clearly and cogently in both speech and writing. First-year writing seminars, required of nearly all Cornell first-year students, are designed to develop these skills. English literature and composition, and communication courses, also serve this purpose. Logic and mathematics develop exactness of thought. Also of value are economics, history, government, and sociology, because of their close relation to law and their influence on its development and ethics, and philosophy, because of the influence of philosophic reasoning on legal reasoning and jurisprudence. Psychology and human development lead to an understanding of human nature and mental behavior. Some knowledge of the principles of accounting and of the sciences such as chemistry, physics, biology, and engineering is recommended and will prove of practical value to the lawyer in general practice in the modern world.
3. Cultural subjects, though they may have no direct bearing on law or a legal career, will expand students' interests; help cultivate a wider appreciation of literature, art, and music; and make better-educated and well-rounded persons.
4. Certain subjects are especially useful in specialized legal careers. For some, a broad scientific background—for example, in agriculture, chemistry, physics, or engineering—when coupled with training in law, may furnish qualifications necessary for specialized work with the government, for counseling certain types of businesses, or for a career as a patent lawyer. A business background may be helpful for those planning to specialize in corporate or tax practice. Students who anticipate practice involving labor law and legislation might consider undergraduate study in the School of Industrial and Labor Relations. Whatever course of study is chosen, the important goals are to acquire perspective, social awareness, and a critical cast of mind; to develop the ability to think logically and analytically; and to express thoughts clearly and forcefully. These are the crucial tools for a sound legal education and a successful career.

   The presence of the Cornell Law School on campus provides the opportunity for a limited number of highly qualified undergraduates registered in the College of Arts and Sciences at the university to be admitted to the Law School. At the time of entry they must have completed 105 of the 120 credits required for the Bachelor of Arts degree, including 92 credits of course work in the College of Arts and Sciences.

   It may be possible for exceptionally well-qualified students in other Cornell undergraduate colleges to arrange to enter the Law School after three years. The College of Human Ecology offers a program in which students spend their fourth year at the Law School. In addition, members of the Cornell Law School faculty sometimes offer undergraduate courses such as Nature, Functions, and Limits of Law, which are open to all undergraduates.

PREMEDICAL STUDY

Medical and dental schools, while not requiring or recommending any particular major course of study, do require that a particular selection of undergraduate courses be completed. These courses usually include general chemistry and organic chemistry, biology, physics, and a year of English composition (or a first-year writing seminar). In addition, many medical schools require or recommend mathematics and at least one advanced biological science course, such as biochemistry, genetics, embryology, histology, or physiology.

There is no major program that is the best for those considering medical or dental school, and students are therefore encouraged to pursue their own intellectual interests. Students are more likely to succeed at, and benefit from, subjects that interest and stimulate them, and there is no evidence that medical colleges give special consideration to any particular undergraduate training beyond completion of the required courses. In the past, successful Cornell applicants to medical and dental schools have come from the Colleges of Arts and Sciences, Agriculture and Life Sciences, Human Ecology, and Engineering. The appropriate choice depends to a great extent on the student's other interests.

Exceptionally qualified students in the Colleges of Agriculture and Life Sciences, Arts and Sciences, and Human Ecology may apply for acceptance to the Medical College through a double registration procedure arranged between Cornell University and Cornell's Weill Medical College in New York City. This procedure allows registered students to save one year in pursuit of the bachelor's and M.D. degrees. This is not a traditional "seven year program"; separate application to the Medical College is required. Further information about this procedure is available from the Health Careers Program office at Cornell Career Services, 103 Barnes Hall, Ithaca, New York, 14853–1601.

PREVETERINARY STUDY

There is no specific preveterinary program at Cornell, and students interested in veterinary medicine as a career should select a major area for study that fits their interests while at the same time meeting the entrance requirements for veterinary college as listed below. Most preveterinary students at Cornell are enrolled in the College of Agriculture and Life Sciences, which offers several applied science majors, including animal science, that can lead to related careers if the student does not go to veterinary college. Some enter other divisions of the university, especially the College of Arts and Sciences, because of secondary interests or the desire for a broad liberal arts curriculum.

The college-level prerequisite courses for admission to the College of Veterinary Medicine at Cornell are English composition, biology or zoology, physics, inorganic chemistry, organic chemistry, biochemistry, and microbiology. All science courses must include a laboratory. These requirements, necessary for admission to the College of Veterinary Medicine at Cornell, may vary at other veterinary colleges.

For information on additional preparation, including work experience and necessary examinations, students should consult the brochure, *Admissions Information*, obtained by writing to the Office of DVM Admissions, College of Veterinary Medicine, Cornell University, S2–009 Schurman Hall, Ithaca, New York 14853–6401. Information on the Guaranteed Admissions Program is available from the same address.

Qualified students in the College of Agriculture and Life Sciences may apply for acceptance in a double-registration program arranged between Cornell University and the College of Veterinary Medicine at Cornell. This program allows registered students to save one year in pursuit of the bachelor's and D.V.M. degrees. Further information about this program is available from the Health Careers Program office at the Career Center, Cornell University, 103 Barnes Hall, Ithaca, New York 14853–1601.

[1] Adopted by the Faculty Council of Representatives, May 24, 1976, Records, pp. 4525–27C, Appendix A; March 11, 1981, Records pp. 5298–5303C; May 12, 1982, Records, pp. 5505–06C; April 10, 1985, Records pp. 5991–6002C and May 15, 1985, Records, pp. 6073–84.

[2] "Arbitrary and Capricious" describes actions which have no sound basis in law, facto, or reason are grounded solely in bad faith or personal desires. A determination is arbitrary and capricious only if it is one no reasonable mind could reach.

[3] "Clear and convincing" as a standard of proof refers to a quantum of evidence beyond a mere preponderance but below that characterized as "beyond a reasonable doubt" and such that it will produce in the mind of the trier of fact a firm belief as to the facts sought to be established.

[4] See the definition at section II.B.4.c.

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

ADMINISTRATION

Susan A. Henry, dean

William E. Fry, senior associate dean

John M. Finamore, associate dean for financial affairs

Mary Lou Doyle, assistant dean for human resources

Michael P. Riley, assistant dean for public affairs

H. Dean Sutphin, associate dean and director of academic programs

Donald R. Viands, associate director of academic programs

Daniel J. Decker, associate dean and director of the Cornell University Agricultural Experiment Station

Anthony M. Shelton, associate director of research

D. Merrill Ewert, associate dean and director of cooperative extension

Edward D. Harwood, associate director of cooperative extension

Margaret E. Smith Einarson, associate director of cooperative extension

Norman T. Uphoff, director of international agriculture

James E. Haldeman, associate director of international agriculture

Terry W. Tucker, associate director of international agriculture

Office of Academic Programs Staff

Counseling and advising: Lisa Ryan, Bonnie Shelley

Registrar: Mary Milks, Patricia Austic

Admissions: Robert Springall, Ann LaFave, Bernadette Soto, Bryan Nance

Career development: Amy Benedict-Augustine, Laurie Gillespie, Pamela Hampton

Minority programs: Catherine Thompson

Department Chairs

Agricultural and biological engineering: M. F. Walter, Riley-Robb Hall

Applied economics and management: A. M. Novakovic, Warren Hall

Animal science: A. W. Bell, Morrison Hall

Atmospheric science unit (part of earth and atmospheric sciences): S. J. Riha, Bradfield Hall

Biometrics: M. T. Wells, Ives Hall

Communication: R. E. Ostman, Kennedy Hall

Crop and soil sciences: S. D. DeGloria, Emerson Hall

Ecology and evolutionary biology: R. G. Harrison, Corson Hall

Education: D. E. Hedlund, Kennedy Hall

Entomology: D. A. Rutz, Comstock Hall

Food science: D. Miller, Stocking Hall

Horticultural science: H. C. Wien, Plant Science Building

Landscape architecture: Kennedy Hall

Microbiology: S. H. Zinder, Wing Hall

Molecular biology and genetics: D. I. Shalloway, Biotechnology Building

Natural resources: J. P. Lassoie, Fernow Hall

Neurobiology and behavior: C. Walcott, S. G. Mudd Hall

Plant breeding: Emerson Hall

Plant pathology: R. Loria, Plant Science Building

Rural sociology: P. D. McMichael, Warren Hall

Statistical sciences: B. W. Turnbull, Mallott Hall

College Focus

The College of Agriculture and Life Sciences provides educational programs that prepare men and women with technical, management, and leadership skills.

The college focuses on a broad-based education for its students, and on a problem-solving and basic research program. The program is geared to the discovery and dissemination of knowledge for the purpose of advancing the food system, agriculture, nutrition, biological sciences, environmental quality, and community and rural development throughout New York State, the nation, and the world.

There are six primary areas of focus, developed in response to the needs of society, and representing agriculture and life sciences in their broadest and most dynamic meaning:

- Agriculture (production and marketing)
- Biological Sciences
- Community, Human, and Rural Resources
- Environment
- Food and Nutrition
- International

Facilities

The College of Agriculture and Life Sciences is located on the upper campus, up the hill from the central area of Cornell University, on land that was once part of the Ezra Cornell family farm.

Buildings around the area commonly known as the Ag Quad house classrooms, offices, and laboratories. Flanking them are the greenhouses, gardens, and research facilities. Nearby orchards, barns, field plots, forests, and streams extend as far as the Animal Science Teaching Research Center at Harford and the Agricultural Experiment Station at Geneva.

Roberts Hall serves as headquarters for the administrative units, including offices of the deans and directors of academic programs, research, and cooperative extension. Included in the Office of Academic Programs are the director and associate director, the Admissions Office, the Career Development Office, the Counseling and Advising Office, the Office of Minority Programs, and the Registrar.

Mann Library, with its extensive collections of materials in the agricultural and biological sciences, is at the east end of the Ag Quad. The student lounge and service center, known as the Alfalfa Room, and many of the college classrooms are in Warren Hall. Public computer facilities are available in Warren Hall, in Riley-Robb Hall, and in Mann Library.

DEGREE PROGRAMS

The College of Agriculture and Life Sciences offers programs leading to the degrees of Bachelor of Science, Master of Science, and Doctor of Philosophy. Professional degrees include the Master of Professional Studies and the Master of Arts in Teaching. Some registered professional licensing and certification programs are also available.

Each curriculum in the college creditable toward a degree is registered with the New York State Education Department and is linked with the national Higher Education General Information Survey (HEGIS) codes for federal and state reporting.

Graduate Degrees

Graduate study is organized by fields that generally coincide with the academic departments but may draw faculty from several disciplines in the various colleges of the university. The following graduate fields have primary affiliation in Agriculture and Life Sciences. Current directors of graduate studies are also listed.

Agriculture [M.P.S. (Agr.)]: H. D. Sutphin, Roberts Hall

Agricultural and Biological Engineering: D. J. Aneshansley, Riley-Robb Hall

Agricultural Economics: R. N. Boisvert, Warren Hall

Animal Breeding: E. J. Pollak, Morrison Hall

Animal Science: R. L. Quaas, Morrison Hall

Atmospheric Sciences

Biochemistry, Molecular and Cell Biology: W. J. Brown, Biotechnology Building

Biometry: M. Wells, Warren Hall

Communication: J. E. Shanahan, Kennedy Hall

Development Sociology: C. C. Geisler, Warren Hall

Ecology and Evolutionary Biology: D. W. Winkler, Corson Hall

Education [also M.A.T.]: D. J. Trumbull, Kennedy Hall

Entomology: E. Shields, Comstock Hall

Environmental Toxicology: A. Yen, Rice Hall

Food Science and Technology: H. T. Lawless, Stocking Hall

Genetics and Development: K. J. Kemphues, Biotechnology Building

Horticulture: N. L. Bassuk, Plant Science Building

International Agriculture and Rural Development [M.P.S. (Agr.)]: R. W. Blake, Morrison Hall

International Development: N. T. Uphoff, Caldwell Hall

Landscape Architecture [M.L.A.], D. W. Krall, Kennedy Hall

M.P.S. Agriculture with Peace Corps Option (offered by most agriculture fields with M.P.S. programs): J. Haldeman, Warren Hall or see director of graduate studies for chosen field

Microbiology, S. C. Winans, Wing Hall

Natural Resources, M. E. Krasny, Fernow Hall

Neurobiology and Behavior, C. D. Hopkins, Seeley-Mudd Hall

Nutritional Sciences, M. N. Kazarinoff, Martha Van Rensselaer Hall

Physiology, S. S. Suarez, Vet Research Tower

Plant Biology, J. B. Nasrallah, Plant Science Building

Plant Breeding, M. E. Sorrells, Bradfield Hall

Plant Pathology, J. W. Lorbeer, Plant Science Building

Plant Protection [M.P.S. (Agr.)], Plant Science Building

Soil and Crop Sciences

Statistics, M. Wells, Malott Hall

Zoology, J. W. Hermanson, Schurman Hall

Bachelor of Science Degree

Departments in the College of Agriculture and Life Sciences sponsor study for the B.S. degree in 20 major programs. To qualify for the degree, students must fulfill requirements established by the faculty of the college and administered through the Office of Academic Programs. The following units offer major fields of study for undergraduates. A faculty advising coordinator is listed for each unit. Students should consult with the faculty coordinator regarding requirements and opportunities for concentrations in the major field.

Agricultural and Biological Engineering: Jim Bartsch, 314 Riley-Robb Hall

Applied Economics and Management: Dale Grossman, 204 Warren Hall

Animal Sciences: W. Bruce Currie, 434 Morrison Hall

Atmospheric Sciences: Dan Wilks, 1113 Bradfield Hall

Biological Sciences: Jeff Doyle, 200 Stimson Hall; Bonnie Comella, 216 Stimson

Biology and Society: Marta Weiner, 275 Clark Hall

Biometry and Statistics: Steve Schwager, 424 Warren Hall

Communication: Brian Earle, 328 Kennedy Hall

Crop and Soil Sciences: Ray Bryant, 705 Bradfield Hall

Education: George Posner, 416 Kennedy Hall

Entomology: Bobbie Peckarsky, 3134 Comstock Hall

Floriculture and Ornamental Horticulture: Ken Mudge, 20 Plant Science Building

Food Science: Janice Brown, 107 Stocking Hall

Landscape Architecture: Peter Trowbridge, 440 Kennedy Hall

Natural Resources: Tim Fahey, 12 Fernow Hall

Nutrition, Food, and Agriculture: Carole Bisogni, 334 MVR Hall

Plant Science Units (Plant Biology, Genetics and Breeding, Pathology/Protection, Pomology, Vegetable Crops): George Hudler, 315 Plant Science

Rural Sociology: Paul Eberts, 319 Warren Hall

Science of Earth Systems: Kerry Cook, 3114 Snee Hall

Special Programs in Agriculture and Life Sciences: Lisa Ryan, 140 Roberts Hall; Terry Tucker, 31 Warren Hall, for International Agriculture Program

Summary of Basic College Requirements for Graduation

1. **Credit Hours**

a. Minimum: 120

Exception: Credit for tutorial courses (Math 109, EDUC 005, and 00 level) **increase** the number of credits required for graduation by the number of credits in the course. The credits **do** count toward the minimum 12 credits for full-time status.

b. Minimum at Cornell: **60**; Maximum transferred in (C- or higher): **60**

c. Minimum from College of Agriculture and Life Sciences: **55** (includes credit used in the distribution and appropriate transfer credit)

d. Maximum from endowed colleges (Arts and Sciences; Architecture, Art, and Planning; Engineering; and Hotel School) without additional charge: **55** (includes credit used in the distribution **AND** failed courses)

e. Minimum with letter grade: 100; Maximum with S-U grade based on 120 credits: 20 (prorated for transfer students) with maximum of one course per semester

f. Maximum independent study, teaching experience, internships based on 120 credits: **15** (pro-rated for transfer students)

g. Credit for physical education **does not** count toward the 120 credits or the minimum 12 credits for full-time status (see #6).

2. **Residence**

a. Students are entitled to enroll eight full-time semesters (prorated for transfer students). A full-time semester requires a minimum of 12 credits per semester, **not** counting physical education. Tutorial courses (see #1A) **are** counted.

b. A minimum of seven semesters is required.

c. Internal transfer students must be enrolled in CALS for at least two semesters, **not** including residency in Internal Transfer Division.

d. The final semester before graduation **must** be in residence at Cornell as a full-time student in good academic standing.

Exception: Students with eight or fewer credits remaining for graduation and with circumstances that prevent full-time study may petition for approval to complete remaining credits at another institution or part-time in CALS.

3. **Grade-point Average (GPA)**

Cumulative GPA: 2.00 or above must be maintained. Includes only grades earned at Cornell after matriculating into the college.

For students matriculated prior to 8/01: Cumulative GPA: 1.70 or above must be maintained. Includes only grades earned at Cornell after matriculating into the college.

4. **Distribution**

The purpose of the distribution requirement is to provide a broad educational background and to ensure a minimum level of competency in particular skills. Through study of the physical sciences, students develop quantitative and analytic skills based on an understanding of the physical laws governing the universe and through study of the biological sciences, they gain an appreciation of the variability of living organisms. The social sciences and humanities give students perspective on the structure and values of the society in which we live, and prepare them to make decisions on ethical issues that will affect their work and role in society. Through development of written and oral expression skills, students master the essentials of effective communication.

Credits received for independent study, field, teaching, work experience, and internships cannot be used to fulfill the distribution requirement. Courses judged to be remedial in the discipline, such as Education 005, will not be counted.

Group A: Physical Sciences. 9 credits of 100- or 200- level courses, in at least two disciplines, including at least one course in chemistry or physics.

Chemistry
Physics
*Mathematics (excluding Education 005, Mathematics 103 and 109)
Education 115
Earth and Atmospheric Sciences (SCAS) 131, 260
Crop and Soil Sciences (SCAS) 260
Astronomy
Geology
Statistics and Biometry (including AEM (ARME) 210, ILRST 210)

*The college mathematics requirement is described below.

Group B: Biological Sciences. 9 credits, to include 6 of introductory biological science (introductory courses include BIO G 101–104, 105, 106, 109, 110.)

Biological Sciences (excluding 160, 200 [unless permission of the director of Undergraduate Biology is obtained], 202, 209, or 367)

Animal Sciences 100, 110, 221, 300, 301
Crop and Soil Sciences (SCAS)/Horticulture 366
Entomology 212
Nutritional Sciences 262
Plant Breeding 201, 225
Plant Pathology 309, 401

Group C: Social Sciences and Humanities. 12 credits (6 in each of the following two categories):

Social Sciences. 100- through 400-level courses in the following departments (*excluding* Freshman Seminars):
American Indian Studies 401
Anthropology
Archaeology
AEM (ARME) 416
Communication 116, 120, 410, 418, 420, 422
Economics (excluding all AEM (ARME) courses)
Education 271, 311, 317, 370, 378
Government
HD 150 (cannot receive credit for this course and Soc 151)
LA/CRP 261, 360, 363
Psychology (except 111)
S & TS 324, 350, 390, 391, 400, 401, 406, 407, 427, 442, 467, 483
Sociology (includes Rural Sociology except RS 100, 175, 305, 311, 318, 325, 333, 442)

Humanities. 100- through 400-level courses in the following departments (*excluding* Freshman Seminars and language courses):
Africana Studies (literature and history)
Asian American Studies
Asian and Near Eastern Studies (literature and history)
Classics (literature and history)
Comparative Literature
English (*literature only*)
French, German, Italian, Russian, and Spanish (*literature only*)
History
History of Art/History of Architecture
LA 282
Music and Theatre Arts (theory, literature, and history only)
Natural Resources 212, 407, 411
Philosophy
Religious Studies
Rural Sociology 100, 175, 318, 442
S & TS 205, 206, 233, 250, 281, 282, 286, 292, 360, 381, 433, 444, 447, 490
Women's Studies 444

Group D: Written and Oral Expression. 9 credits, of which at least 6 must be in written expression, selected from the following:

Written Expression
Freshman Seminars
Communication 117, 350, 352, 260 (was 360), 263 (was 363), 365
Education 100
English 280–281, 288–289, 382–385, 388–389
Oral Expression
Comm 201, 203

Students scoring 4 or 5 on the English advanced placement exam may be awarded three credits which will be recorded in Group D.

5. **Math Requirement**

Faculty legislation requires minimum competency in mathematics to complete a degree in the College of Agriculture and Life Sciences. As a measure of competency in mathematics, all entering undergraduates, including those with advanced placement or transfer credit in calculus, must take the college math proficiency exam (administered during orientation). The following students are exempt from the CALS Math Placement Exam: 1.) internal transfer students who already have passed one math course listed below under Group II section 1, and 2.) entering ABEN students (who take the placement exam in the College of Engineering).

The CALS exam score determines the college math graduation requirement, and provides placement information. The exam has two components. Cut-off scores divide students into three groups, each with specific graduation requirements.

Mathematics requirements and placement suggestions:

Group I Students in this group are considered proficient in math for college graduation requirements. If further math is needed for the major, placement score *suggests* calculus skill level (e.g., Math 111, 191, 193).

Group II Placement score suggests precalculus skill level, and students in this group must satisfy one of the following:

(1) Successfully complete an approved mathematics or statistics course at Cornell. EDUC 115 is recommended. Other approved courses are any mathematics course (except for Math 103, 109); AEM (ARME) 210; BTRY 100, 101, 102, 201, 261, 302; ILRST 210, 211, 310, 311, 312, 313, 314; ENGRD 270.

(2) Successfully complete or have completed an approved calculus course at another college or university with a final grade of B- or better.

(3) Receive AP credit for calculus or statistics.

Group III Students in this group must successfully complete an approved mathematics or statistics course at Cornell (see list in Group II above). Prior completion of EDUC 005 may be recommended at the discretion of the student's academic adviser.

Transfer and AP math credit (up to six) will be recorded in Group A of the college distribution requirements. Additional transfer credit in math will be recorded as general electives. ABEN students typically receive fewer AP credits than other CALS students with the same scores. ABEN students also may receive AP credits based on the Engineering math placement exam.

6. **Physical Education**

a. Pass a required swim test, administered during orientation.

b. Two courses with a satisfactory grade (courses do **not** count toward 120 credits for graduation or the minimum 12 credits for full-time study).

c. Students are expected to complete the physical education requirement in their first two semesters at Cornell.

d. Transfer students are credited with one course of physical education for each semester previously enrolled **full-time** (12 or more credits) at another college.

Faculty Advising

a. Each student is assigned to a faculty adviser soon after being admitted to the college. The faculty adviser will help the student plan a program of study of courses appropriate to the degree programs offered by the college.

b. Course enrollment each semester should be planned in consultation with the faculty adviser. Students pre-enroll for courses by computer through CoursEnroll, under courses, classes, and exams on the Bear Access menu. Pre-enrollment by computer is not valid until the student's individual code is entered. This code, or adviser key, is provided to the student by the faculty adviser after approval of the choice of courses.

c. All academic plans, such as acceleration and graduate study, should be made in consultation with the student's faculty adviser. Support of the adviser is essential if a student petitions for an exception to any of the requirements of the college.

Progress toward the Degree

a. The progress of each student toward meeting the degree requirements is recorded each term in the college registrar's office on a *Summary of Record* form.

b. Students who have been in residence for eight semesters and who have met the graduation requirements will be graduated. Students are entitled to attend for the full eight semesters even if they have completed the graduation requirements in fewer semesters. A student who wishes to continue study after graduation must apply for admission as a special student through the college admissions office, 177 Roberts Hall.

c. Application to graduate. Students who are planning to graduate must complete an "Application to Graduate" by the end of the fourth week of classes in the spring semester for May graduates or in the fall semester for January graduates. The adviser signs the application after verifying that the requirements for the major have been completed. The college registrar signs after verifying that the college requirements will be fulfilled after successful completion of the student's final semester.

Credit Earned While in High School

Transfer credit will *not* be accepted for the Syracuse Project Advance Program and similar programs. If a student is enrolled in a college/university course during his/her high school years, transfer credit will be given *only* if certain criteria are met:

1. Course must be a standard course taught by a post-secondary institution.
2. High school must be a satellite location, one of several options available to *all* students taking the course.
3. Course syllabus, text, examinations, and evaluation process must be the same for *all* students at *all* sites.
4. Students must be enrolled for college credit and pay college tuition.
5. Instructor must be a faculty member (includes adjunct) at the offering college.

If one of these is not met, no transfer credit will be given. Written verfication may be necessary.

CLEP Credit

The College of Agriculture and Life Sciences awards CLEP (College-Level Examination Program) credit if a student achieves an acceptable score on the CLEP exam. Please contact the Registrar's Office in 140 Roberts Hall for specific information about CLEP credit.

STUDENTS

Undergraduate enrollment is approximately 3,100, with about 56 percent in the upper division. Each year about 850 students are graduated, while 635 freshmen and 250 new transfer students are enrolled. College faculty members serve as chairs of the special committees of roughly 1,100 graduate students.

Admission

The College Admissions office selects applicants who are academically well prepared and appear most likely to benefit from the college's various curricula.

While most students come from New York State, about 30 percent come from other parts of the United States or abroad. Slightly more than half of the undergraduates are women. Approximately 22 percent are self identified as members of minority ethnic groups.

Transfer Students

Approximately 18 to 20 percent of ALS undergraduate students are transfers who have completed part of their collegiate work at community colleges, agricultural and technical colleges, or other four-year institutions. Many of them hold an associate degree.

A Cornell student in good standing may apply for an intra-university transfer to pursue a course of study unavailable in his or her current college. Guidelines are available in the Admissions Office of the College of Agriculture and Life Sciences, 177 Roberts Hall. The procedure involves filing a transfer request, meeting with a faculty member in the proposed area of study and submitting a letter of explanation for the transfer.

Consideration is given to students who have demonstrated an interest in their proposed field of study, by taking appropriate prerequisite courses and courses within the area of study. Academic achievement is also considered. Students are seldom allowed to transfer during their freshman year. In certain cases a student may be referred to the Internal Transfer Division (ITD) to study for one semester before entering the college. A second semester in ITD is considered only in unusual circumstances. During this trial semester the student must achieve a predetermined average (usually 2.7) and take approved courses to assure acceptance.

Special Students

A limited number of non-degree candidates who want to take courses in the college are admitted each year. Applicants should submit the standard Cornell application, a resume of their work experience, and a list of the courses in which they are interested. For more information and guidelines, students should contact the Admissions Office, 177 Roberts Hall.

Off-Campus Students

Programs in which students study off campus but enroll for Cornell credit include SEA semester, field study in human ecology or industrial and labor relations, Albany programs, Cornell-in-Washington, student teaching, IPM internship, and clinical microbiology internship. **Students intending to receive Cornell credit for work done off campus should inform the college registrar at the time of enrolling for courses to ensure that proper registration will occur.**

Off-Campus Courses

Students in CALS must be registered for at least 12 credits of course work each semester. It is expected that students will not be enrolled in course work at another institution while they are enrolled at CALS.

Two exceptions to enrollment elsewhere while being a full-time student at Cornell would be the joint enrollment agreements between Cornell and Ithaca College and Wells College. Other exceptions must be reviewed by the Committee on Academic Achievement and Petitions. Students must petition *before* enrolling for a course elsewhere. The committee may approve such petitions only when there are compelling circumstances such as severe scheduling problems or no equivalent course available at Cornell. Enrolling in a course at another college to avoid taking it at Cornell is not permitted.

Leave of Absence

A student wishing a break from studies in a future semester, or those who find it necessary to leave the university before the end of a semester, should submit a written petition for a leave of absence. Such action is necessary to clear the record for the semester and if not taken may adversely affect the student's subsequent readmission to the university.

An approved leave is considered a voluntary interruption in study and holds the student's place in the college without requiring reapplication to the university. Voluntary leaves are issued two ways: unrestricted for students in good academic standing (no restrictions placed on length of leave, activities pursued, and simple notification by student of intent to return), and restricted (length of leave and activities pursued may be specified, and a petition to return must be approved by the Petitions Committee).

A database is maintained by the Counseling and Advising Office to assist participation in pre-course enrollment the semester before a student's return.

Information and petition forms are available in the Counseling and Advising Office, 140 Roberts Hall.

Withdrawal

A student who wishes to leave the university permanently should file a petition for withdrawal. Such petitions are approved if the student is in good academic standing. Students who have withdrawn and who later decide to return must apply to the Admissions Office.

Graduation and Diplomas

Graduating seniors must complete the Application to Graduate (see the details in Part C of "Progress toward the Degree"). Diplomas are distributed to those who have completed the degree requirements and have been approved by the college faculty. After the commencement ceremony at Schoellkopf Field in May, graduates return to the Ag Quad to obtain their diplomas. For January and August graduates, diplomas are mailed.

ADVISING AND COUNSELING SERVICES

Faculty members in the College of Agriculture and Life Sciences recognize that students need information and advice to make intelligent decisions while in college. They believe that personal contact is the best way to provide information and advice on both academic and personal matters; they consider advising to be an important and integral part of the undergraduate program. Each student enrolled in the college is assigned to a faculty adviser in his or her major field of study for assistance and guidance in developing a program of study, and to enhance the student's academic experience.

The Counseling and Advising Office coordinates the faculty advising program, serves as the college's central undergraduate advising office, and offers personal counseling. Academic advising is available for students who are interested in international study, need to file petitions to waive college academic regulations, have disability concerns, are experiencing academic difficulties, or have requests for tutoring. The staff coordinates new student orientation, award ceremonies, commencement activities, and the activities of Ho-Nun-De-Kah, the college's honor society. Students seek counseling and advising on a variety of issues including academic problems, course problems and college procedures, graduation requirements, personal and family problems, stress management, and time management. Two counselors provide short-term counseling with an expertise in college policies and guidelines. Counseling is framed as appropriate to each student's academic circumstances. The staff is available on a walk-in basis, as well as by appointment.

The Office of Minority Programs serves to recruit, admit, monitor, and influence policy on behalf of all minority students in the College of Agriculture and Life Sciences. This population is defined as encompassing all African American, Latin American, Asian American, and Native American students. In the past academic year, this population represented approximately 20 percent of the college's undergraduate population. Additionally, the office is charged with monitoring and programming for the Educational Opportunity Program (EOP) and the Prehealth Collegiate Science and Technology Entry Program (CSTEP). EOP and CSTEP are state-supported programs intended to assist New York State students who meet economic and academic criteria set by the college, State Programs Office, and New York State Board of Regents. For further information, please contact Catherine Thompson in 140 Roberts Hall.

Within the university, the Office of Minority Programs is charged with acting as the college

liaison with the central Office of Minority Education Affairs, the Learning Strategies Center, and the State Programs Office. Other university connections include the Undergraduate Admissions Office and the Office of Financial Aid regarding the concerns of the minority student population. The director, assistant director, and 7 to 10 peer advisers primarily carry out the duties of the Office of Minority Programs. Together, the staff acts as a major advocacy and advising group, as well as an informational and referral center. The director and assistant director provide support for the Academic Human Diversity and Resources Committee. Its constituency includes students, faculty, and the general public.

Given the college's policy on non-exclusionary programming, the Office of Minority Programs is also responsible for some functions that serve the college's entire population. Presently, that includes reviewing non-minority applicant folders, serving as the Prehealth Program adviser and liaison, and providing ongoing support at all levels for the Office of Counseling and Advising.

The Office of Career Development offers a variety of helpful services to all students and alumni of the college. Career development includes self-assessment, career exploration, decision making, and transition to employment or further study. Services are designed to assist students and alumni with those activities and to help them develop the career planning and job search skills they will find useful as their career paths progress and change.

The Career Library contains an extensive collection of current and useful material, including career information books, extensive internship files, employer directories, and job listings. Alumni Career Link is a database of 300 college alumni who have offered to help students and alumni with their career development in a variety of ways. Job search talks on topics such as resume writing, cover letter writing, and interview skills are presented throughout the semester and are available on videotape. An active on-campus recruiting program brings more than 90 employers to campus each year to interview students for full-time and summer jobs. Additionally, the office provides information on hundreds of internships.

The office, in conjunction with a network of college faculty and staff members, assists students throughout their undergraduate years and beyond. For further information, students should contact Amy Benedict-Augustine and the staff in 177 Roberts Hall.

Financial aid is administered through the university office in Day Hall. Endowment funds and annual donations provide supplemental aid for students in the college who are eligible for financial aid. Information about these college grants is available from the Office of Academic Programs in Roberts Hall for students who have their financial aid package established through the university office in Day Hall. Grants are processed through the university's Office of Financial Aid.

Academic Integrity Policy

The College of Agriculture and Life Sciences faculty, students, and administration support and abide by the university Code of Academic Integrity. Its principle is that absolute integrity is expected of every student in all academic undertakings: students must in no way misrepresent their work, fraudulently or unfairly advance their academic status, or be a party to another student's failure to maintain academic integrity.

The maintenance of an atmosphere of academic honor and the fulfillment of the provisions of the code are the responsibility of the students and the faculty. Therefore, all students and faculty members shall refrain from any action that would violate the basic principles of this code.

1) Students assume responsibility for the content and integrity of their submitted work, such as papers, examinations, or reports.
2) Students are guilty of violating the code if they
   - knowingly represent the work of others as their own
   - use or obtain unauthorized assistance in any academic work
   - give fraudulent assistance to another student
   - fabricate data in support of laboratory or field work
   - forge a signature to certify completion or approval
   - submit the same work for two different courses without advanced permission
   - knowingly deprive other students of library resources, laboratory equipment, computer programs, or similar aids
   - in any other manner violate the principle of absolute integrity
3) Faculty members assume responsibility to make clear to students and teaching assistants specific regulations that apply to scholarly work in a discipline.
4) Faculty members fulfill their responsibility to
   - maintain in all class, laboratory, and examination activities an atmosphere conducive to academic integrity and honor
   - make clear the conditions under which examinations are to be given
   - make clear the consequences of violating any aspects of the code
   - provide opportunities for students to discuss the content of courses with each other and help each other to master that content and distinguish those activities from course assignments that are meant to test what students can do independently
   - state explicitly the procedures for use of materials taken from published sources and the methods appropriate to a discipline by which students must cite the source of such materials
   - approve in advance, in consultation with other faculty members, which work submitted by a student and used by a faculty member to determine a grade in a course may be submitted by that student in a different course
   - monitor the work and maintain such records as will support the crucial underpinning of all guidelines: the students' submitted work must be their own and no one else's

Cornell's Code of Academic Integrity spells out how individuals who have allegedly violated Cornell standards for academic integrity are to be confronted and, if found to be in violation of those standards, sanctioned. The code provides informal resolution of most perceived violations through a primary hearing between the faculty member, the student involved, and an independent witness. If necessary, a hearing before a hearing board follows.

The Academic Integrity Hearing Board for the College of Agriculture and Life Sciences consists of three elected faculty members, three elected student members, a chair appointed by the dean, and the director of counseling and advising, who serves as a non-voting record keeper. Professor Dale Grossman is the current chair.

Individuals who observe or are aware of an alleged violation of the code should report the incident to the faculty member in charge of a course or to the chair of the hearing board. General information and details on procedures for suspected violations or hearings are available from the Counseling and Advising Office, 140 Roberts Hall.

ACADEMIC POLICIES AND PROCEDURES

Records

The college registrar maintains a complete academic record for each matriculated student. The director of enrollment management and student records, registrar, and associate registrar are available to consult with students regarding the assignment of credit toward meeting distribution and elective requirements as listed on the *Summary of Record* form.

Registration Procedures

All students must register with the university *and* check-in with this college at the beginning of each semester. Check-in materials are available in 140 Roberts Hall as announced each term by the university registrar.

Course Enrollment Procedures

To enroll in courses, students will receive information from the university registrar; plan a schedule in consultation with their adviser; and pre-enroll by computer, through CoursEnroll in "Just the Facts" on the Bear Access menu. Pre-enrollment is not valid until the student enters the adviser key code into the computer. Adviser key codes are provided by faculty advisers after a discussion of selections and requirements takes place. The adviser key code changes each semester to ensure ongoing contact between student and faculty adviser.

To enroll in courses that involve independent study, teaching, or research, a student must file an independent study form, available in the college Registrar's Office, 140 Roberts Hall. Students who will be studying off campus should notify the Registrar's Office to ensure that proper registration will occur.

Students may enroll again for a course in which they received a grade of F in a previous semester. Both grades will be recorded and calculated as part of their GPA. If a student retakes a course in which a passing grade was earned, the second time will be for no credit.

Students must *not* enroll again for a course in which they received an incomplete or NGR. Instead, work for that course should be completed without further enrollment. The instructor files a manual grade form to the college registrar when a grade has been assigned. An incomplete not made up by the end of two successive semesters of residence reverts to a failure. In the case of a graduating senior, incompletes revert to failures at the time of graduation.

Students enrolled in a two-semester course will receive an R at the end of the first semester and should enroll again for the same course the second semester. The letter grade will be recorded for the second semester when all work for the course is completed. A note on the transcript will explain the R grade.

A student is held responsible for and receives a grade for those courses in which he or she enrolls unless the student officially changes such enrollment. All changes in courses or credit, grading options, or sections must be made by the student at the Registrar's Office, 140 Roberts Hall, on the official university course drop and add form. Approval and signature of the faculty adviser and course instructor are required to change course enrollment.

Students may add courses and change grading options or credit hours where applicable during the first three weeks of the term, and may drop courses until the end of the seventh week.

Students wishing to withdraw from a course after the end of the seventh week must petition to the college Committee on Academic Achievement and Petitions (also see Petitions Procedures below). Petition forms are available in Counseling and Advising, 140 Roberts Hall. Requests for course changes are approved only when the members of the committee are convinced that unusual circumstances are clearly beyond the control of the student. The committee assumes that students should have been able to make decisions about course content, total workload, and scheduling prior to stated deadlines. A grade of W (for "withdrawal") is recorded on the transcript if a petition to drop a course is approved after the end of the seventh week of classes, and if an approved drop results in fewer than twelve credits.

Petitions Procedures

The Committee on Academic Achievement and Petitions is a college committee of six faculty and two student members. On behalf of the faculty, the committee

- reviews, at the end of each semester and at other times as shall seem appropriate to the committee, the progress of students toward meeting graduation requirements
- receives and acts upon petitions from individual students asking for exceptions from particular academic regulations or requirements of the college, or for reconsideration of action previously taken by the committee
- acts upon readmission requests from persons whose previous enrollment was terminated by the committee
- notifies the petitioner in writing of the action taken by the committee

A petition for exemption from a college academic requirement or regulation may be filed by any student who has grounds for exemption. Forms are available in the Counseling and Advising Office, 140 Roberts Hall. Counselors are available to assist with the process.

A petition is usually prepared with the assistance of a student's faculty adviser, whose signature is required. The adviser's recommendation is helpful to the committee. The committee reviews the written petition and determines whether there is evidence of mitigating and unforeseen circumstances beyond the control of the student that would warrant an exemption or other action. Petitions for withdrawing from a course are discussed above.

Academic Deficiency Policies

At the end of each semester, the Committee on Academic Achievement and Petitions reviews the records of those students who in any respect are failing to meet the academic requirements of the college or who persistently fail to attend classes. For students not making satisfactory progress, the committee takes appropriate action, including, but not limited to, issuing warnings, placing students on probation, granting students leaves of absence, advising students to withdraw, suspending or expelling students.

Specifically, the committee considers as possible cause for action, failure to attend and participate in courses on a regular basis or, at the end of any semester, failure to attain one or more of the following:

- semester GPA of at least 2.0*
- cumulative GPA of at least 2.0*
- satisfactory completion of 12 or more credits per semester
- reasonable progress toward completion of distribution requirements
- appropriate completion of college and university requirements

In general terms, regular participation in course work with academic loads at a level sufficient to assure graduation within eight semesters and grades averaging C (2.0) or higher are prima facie evidence of satisfactory progress and good academic standing.

*For those students matriculating 8/01 or later. Requirements are 1.70 for those who matriculated prior to 8/01.

Grade Reports

Grade reports for the fall semester are available on "Just the Facts" in January; grade reports for the spring semester are mailed by the Office of the University Registrar to students at their home addresses unless alternative addresses are reported to the college or university registrar by mid-May.

ACADEMIC HONORS

The college encourages high academic achievement and recognizes outstanding students in several ways:

Dean's List. Each semester, students are recognized for academic excellence by inclusion in the Dean's List. Eligibility for the Dean's List in the College of Agriculture and Life Sciences is determined by the following criteria:

1) a minimum course load for the semester of 12 letter-graded credits;
2) achievement of a semester GPA of at least 3.50; and
3) achievement of an 'S' grade, or a 'C-' or better grade in each course (including physical education), with no Incompletes. Dean's List will be granted retroactively if students meet all the requirements after successful course completion to make up INC grades.

Bachelor of Science with Honors. Students receiving a cumulative GPA of 4.0 or greater (based on the last four full-time semesters of Cornell credits in residence, with a minimum of 48 letter graded credits) will graduate "summa cum laude."

Students receiving a cumulative GPA of greater than or equal to 3.75 and less than 4.0 (based on the last four full-time semesters of Cornell credits in residence, with a minimum of 48 letter graded credits) will graduate "magna cum laude."

Students receiving a cumulative GPA of greater than or equal to 3.5 and less than 3.75 (based on the last four full-time semesters of Cornell credits in residence, with a minimum of 48 letter graded credits) will graduate "cum laude."

Bachelor of Science with Distinction in Research. Students will graduate with a bachelor of science degree with distinction in research when, in addition to having completed all the graduation requirements, they have satisfactorily completed the research honors program in their area of interest and have been recommended for the degree by the honors committee of that area. Special requirements are given in the section on the Research Honors Program.

Ho-Nun-De-Kah, founded in 1929, is the undergraduate honor society of the College of Agriculture and Life Sciences. Members are recruited from the top 20 percent of the senior class and top 15 percent of the junior class. In keeping with the ideals of encouraging scholarship, leadership, and citizenship, members provide free tutoring and a variety of service activities to both the college and the community.

Gamma Sigma Delta is an honor society of faculty and students in the Colleges of Agriculture and Life Sciences, Human Ecology, and Veterinary Medicine. The common bond is promotion of excellence in work related to the quality of our environment and life as it relates to agriculture and the related sciences. The Cornell chapter recognizes the academic achievements of students, faculty, and alumni of those colleges with nominations for membership and with special awards. To be eligible, seniors must be in the upper 15 percent of their major. Five juniors with the highest grade point average in the college are also nominated. Gamma Sigma Delta also

promotes academic excellence through sponsorship of special programs in the three colleges.

Golden Key is a National Honor Society that recognizes and encourages scholastic achievement and excellence in all undergraduate fields of study. Juniors and seniors with a cumulative GPA of 3.66 or higher are eligible. Visit Golden Key's web site at gknhs.gsu.edu/

RESEARCH HONORS PROGRAM

The Research Honors Program provides students with a special opportunity to work with a faculty mentor to experience the research process. Successful completion of this program requires a thesis written in the style of a master's thesis or professional journal in that area of research. Original research often is published in a professional journal. During the summer of each year, a *CALS Research Honors Proceedings* is published as a compilation of abstracts of the honors theses. Students are required to send an electronic version of their thesis title, abstract, student's name, and the research adviser's name to Ann Gantner, amg28@cornell.edu, by the end of the spring semester.

The Bachelor of Science degree with "distinction in research" is conferred upon those students who, in addition to having completed the requirements for the degree of Bachelor of Science, have satisfactorily completed the honors program in their area of major interest and have been recommended for the degree by the honors committee of that area.

Research may be done under the appropriate program area: Animal Sciences, Biological Sciences, Biology and Society, Entomology, Natural Resources, Nutritional Sciences, Physical Sciences, Plant Sciences, and Social Sciences. Each program area has its own requirements in addition to the college requirements. After reviewing the requirements of each program area (below), students' questions may be directed toward the appropriate program area chair.

Consult "Undergraduate Research Opportunities" on the web (http://www.cals.cornell.edu/stud_research/) for information about identifying a research topic, conferring with faculty, and undergraduate funding opportunities.

College Requirements

An undergraduate wishing to enroll in the honors program must have completed at least 55 credits, at least 30 of those 55 at Cornell. Also, the student must have attained a cumulative Cornell GPA of at least 3.0 (unless otherwise noted by a particular program) at the time of entry.

Interested students must make written application no later than the end of the sixth week of the first semester of their senior year, but are encouraged to make arrangements with a faculty member during the second semester of their junior year (or earlier if required by the program area). For most of the program areas, an application form is available from the college registrar in 140 Roberts Hall. The application form also can be printed from the web at http://www.cals.cornell.edu/oap/registrar/HonorMainWebPage.htm. Applications for Biological Sciences students can be picked up at 200 Stimson Hall, and for Biology and Society students at 275 Clark Hall.

Before the completed application is returned to the registrar, signatures of approval are required in the following order: your faculty research mentor, your academic adviser, and the research honors program area chair. After the college registrar verifies the student's GPA, the student will be officially enrolled in the honors program. Additional requirements for application and completion of the program are described under each particular program area.

Academic credit may also be earned by enrolling in an appropriate independent study course (required by some program areas). When applying for admission to the program, the student may, if appropriate, submit a budget and a modest request for funds (up to $350) to cover some of the costs the student incurs in doing the research. If approved, the funding will be transferred from an account in the CALS Office of Academic Programs to a departmental account for the student's research adviser. The research adviser will use this funding to support the student's research. This funding is not to be used as salary for the student. Additional funding opportunities are described on the Undergraduate Research Opportunities web site.

Unless otherwise indicated in the following program area descriptions, the research report in the form of a thesis or journal article should be submitted to the research program committee no later than four weeks before the end of classes of the semester in which the student expects to graduate. Students in the College of Agriculture and Life Sciences wishing to participate in the research honors program must be accepted in one of the program areas approved by the faculty. Students are not eligible for distinction in research by participating in a program offered by another college or administrative unit.

The research honors committee for each program area recommends to the college registrar those students who qualify for honors. Only those who maintain a GPA of at least 3.0 will be graduated with "distinction in research."

For more information, consult the web at http://www.cals.cornell.edu/oap/registrar/HonorMainWebPage.htm

Animal Sciences

Faculty committee: W. B. Currie, chair; Y. R. Boisclair, S. M. Quirk, P. A. Johnson, P. Schofield

The objective of the animal sciences research honors program is to provide outstanding undergraduates with the opportunity to pursue supervised independent research and to develop an awareness of the scientific process. It is expected that the research will require significant effort and creative input by the student in its design and execution and in the reporting of the results.

Those students with majors in animal sciences who are interested in doing a research project should consult with their faculty advisers early in their junior year. All students are expected to meet the college requirements in qualifying for the program and to complete the following:

- Identify a potential research honors project sponsor (i.e., a faculty member working in the animal sciences) and secure that faculty member's commitment to sponsor the student in the research project. This should be accomplished early in the second semester of the junior year.
- Preregister during the spring semester for AS 495, Animal Sciences Honors Seminar, which is offered in the fall semester.
- Register for AS 499, Undergraduate Research.
- Participate in AS 402, Seminar in Animal Sciences, during the spring semester and report on and discuss the project and results (see exceptions under particular program areas).
- Submit a written thesis to the Animal Sciences Research Honors Committee by the scheduled deadline. Specific information regarding deadlines, format, and organization for the thesis will be provided.
- Meet with the Research Honors Committee for a short oral defense of the thesis following a review of the thesis by the student's sponsor and the research committee.

Details pertaining to the specific requirements of the program can be obtained from the office of the committee chair, 434 Morrison Hall.

Biological Sciences

Students interested in the research honors program in the biological sciences should consult with their faculty advisers and with potential faculty, research sponsors early in their junior year. See "Independent Research and Honors Program" in the Biological Sciences section of this catalog for complete details. Information on faculty research, applications, and program requirements may be obtained from the Office of Undergraduate Biology, 216 Stimson Hall.

Biology & Society

Faculty committee: D. Pimentel, chair

The research honors program in Biology & Society is designed to provide independent research opportunities for academically talented undergraduate students in Biology & Society. Students who enroll in this program are expected, with faculty guidance, to do independent study and research dealing with issues in biology and society. Students participating in the program should find the experience intellectually stimulating and rewarding whether or not they intend to pursue a research career.

Biology & Society students are considered for entry into the research honors program at the end of the second semester of the junior year. Application forms for the program are available in the Biology & Society Office, 275 Clark Hall. To qualify for the Biology & Society research honors project, a student must have an overall Cornell cumulative GPA of at least 3.3, have formulated a research topic, and have found a project supervisor (with a Cornell academic appointment) and a Biology & Society faculty member willing to serve as his/her adviser. The director of undergraduate studies will appoint a third reader of the completed research thesis. Applications will be reviewed by a committee

headed by the director of undergraduate studies, who will notify students directly of the outcome. Students will be permitted to register for the research honors program only by permission of the Biology & Society program. Students must enroll for two semesters and may take three to five credits per semester up to a maximum of eight credits in B&SOC 498 and 499, Honors Project I and II. More information on the honors program is available in the Biology and Society Office, 275 Clark Hall (255–6047).

Important Deadlines

(NOTE: If the following dates fall on a weekend, the deadline is the preceeding Friday).

- Last week of second semester of the junior year: Application for honors program submitted to 275 Clark Hall.
- April 15: Thesis completed in a form satisfactory for evaluation and submitted to the three readers.
- April 29: Thesis defense accomplished.
- May 13: Two bound copies of completed and defended thesis submitted to director of undergraduate studies.

Entomology

Faculty committee: B. L. Peckarsky, chair

A research honors program in the area of entomology may be pursued by any qualified student in the College of Agriculture and Life Sciences. The student need not be specializing in entomology. Insects, because of their variety, small size, and easy availability, are convenient subjects for studying a wide array of problems dealing with living systems. Short life cycles, unique physiologies and developmental patterns, and species with easily managed colony requirements and a wide range of behavioral traits provide the raw material for research honors study. Cornell's diverse faculty interests and extensive collections and library in entomology are also major assets for students selecting entomology as their area for research honors study.

Research Honors students have the option of earning academic credit by enrolling in Independent Study (ENTOM 497) during any semester while working toward a Research Honors Thesis. Credits and grade option for satisfying requirements of ENTOM 497 should be discussed with the thesis adviser (see below.) Note: Enrolling in independent study is not a requirement for graduating with distinction in research honors in Entomology.

The Entomology Research Honors Committee requires that an undergraduate who is interested in embarking on a research honors project proceed with the following steps:

- Discuss the matter with his or her academic adviser, preferably in the junior year. This schedule makes it possible to carefully plan a research project, and implement some research during the junior year and/or summer before the senior year.
- Select an appropriate faculty member in the Department of Entomology who can serve as a supervisor to oversee the honors research. This need not be the student's academic adviser. The academic adviser will be of assistance in determining which faculty entomologist has expertise most compatible with the interests of the student.
- Prepare a brief, tentative plan of the project for the discussion and approval of the honors project supervisor. The plan should include a statement of objectives or hypotheses, proposed methods for testing hypotheses, needs for laboratory space or shared equipment, and a budget outlining financial support needed for travel and supplies.
- Submit a completed application and proposal (approved by the honors project supervisor and the chair of the Entomology Research Honors Committee) no later than the end of the sixth week of the first semester of the senior year. Earlier submission is encouraged. Applications are available and should be submitted to the CALS Registrar 140 Roberts Hall. These applications include an opportunity to request a modest amount of funding from the CALS honors program. These funds are distributed only once a year (in late fall).
- Submit a brief progress report, approved by the project supervisor, to the Entomology Research Honors Committee by midterm of the semester in which the student will complete his or her graduation requirements.
- Present a formal seminar reporting the significant findings of the research to the Department of Entomology (as a Jugatae seminar) in the last semester of the senior year.
- Submit two copies of the final honors thesis (as approved by the thesis supervisor) to the chair of the Entomology Research Honors Committee no later than two weeks before the last day of classes in the semester in which the student anticipates graduation. The thesis will be reviewed by the faculty honors project supervisor and one other referee selected by the chair of the honors committee. Referees will return the thesis to the student one week before the last day of classes. If reviewers indicate that changes must be made, the revised thesis should be submitted to the Entomology Research Honors Committee chair no later than the last day of classes. Referees should include a recommendation to the Entomology Research Honors chair regarding acceptability of the honors theses. Approved honors theses will be bound and housed in the Entomology Library in Comstock Hall.

Natural Resources

Faculty committee: J. B. Yavitt, B. A. Knuth, J. P. Lassoie, E. Mills

The research honors program in natural resources provides an opportunity for undergraduates to pursue supervised independent research in the areas of applied ecology or resource policy and management. The subject matter and nature of the research experience may be quite varied. The guidance and supervision of a faculty member with substantial interest and expertise in the subject area is essential to the success of the project.

In addition to meeting requirements of the college, the student is expected to do the following:

- Register for the research honors program in the junior year or earlier.
- Work with a faculty adviser to identify and formulate a research problem.
- If the faculty adviser is not in the Department of Natural Resources, select a co-adviser from the department to insure the research is consistent with the field.
- Carry out an independent research effort that is original and separate from the work of others who may be investigating similar subjects.
- Describe and summarize the work in the format of a conventional master's thesis or scientific paper ready for publication in a scientific or policy journal. A copy is due the first week of April. This version will be reviewed by two ad hoc reviewers, and the student will be able to incorporate their comments and suggestions into the final version which will be due the last day of classes. About half of the theses have been published.
- Give two oral presentations to the group of other honors research students and invited faculty members. Both presentations are during the student's senior year.
- Students should be aware that this requires a considerable time commitment, and they are responsible for meeting deadlines and being prepared for presentations and other meetings.

Nutritional Sciences

Faculty committee: M. N. Kazarinoff

The research honors program offers students a research experience structured to give them the opportunity to choose a research project, search the literature relevant to it, plan and execute the research, and write it up in the form of a thesis. As in other types of research available to undergraduates, each student is guided by a faculty mentor. The honors project is designed to be spread across both semesters of the junior and senior years.

Students who consider this option should be aware that it involves a number of deadlines and considerable time commitment. Before signing on for research honors, students need to consult with their academic advisers to make sure that honors will not interfere with other academic objectives, such as preparation for admission to medical school or making the dean's list. Although honors research credits for spring semester junior year and both semesters senior year are designated LET, individual mentors may choose the R grade for work in progress until the project has been fully completed. Grade is determined by each student's mentor. An outline of activities for both years is given below. Letters of invitation are sent to upcoming juniors during the summer.

Junior Year

Fall Semester Course No: NS 398 (1 credit, S-U): Students are oriented to the program, and provided material that summarizes the range of research activities in DNS. Students begin making arrangements with faculty members. When these arrangements have been completed, students begin a literature search that focuses on their research problems.

Spring Semester Students register for NS 498 (1 credit, section 1). Additional faculty

presentations of research opportunities are made, as well as orientation to supportive services available through DNS. Placements with faculty mentors should be completed by spring break. Each student may also register under the number NS 499 for a convenient number of credits, to be determined in consultation with the chosen adviser. Work carried out will have two objectives:

1. to become familiar with literature and/or research methods appropriate to the problem for the honors research,
2. to develop a research proposal.

The semester outcome will be written reports/discussions of the method(s) or literature searches and a short research proposal, evaluated by the research adviser.

Senior Year

Fall Semester Students will register under the number NS 499 (2–4 credits, LET, by arrangement with their mentors). They may begin their research earlier than fall, (e.g. during the summer, or even earlier) but should be prepared to begin research **early in the fall semester at the latest**. The objective for the semester will be to conclude most of the hands-on research/data acquisition.

Spring Semester Students will again register under course number NS 499 for 2–4 credits, LET, by arrangement with their research mentors. Much of the allotted time will be spent on analyzing data and on writing the honors thesis.

Several important deadlines should be noted.

1. **Last week in March:** The names of thesis readers* are to be in the hands of the research honors committee.
2. **Third to fourth week of April:** A final draft of the thesis is handed to the readers.
3. **First to second week of May:** Scheduled seminars for oral presentations of each student's research.
4. **Last day of classes:** Final form of the thesis is handed to the research honors chair.

To help students meet these deadlines, students register for NS 498 (1 credit, section 2) class sessions will be held before spring break for guidance in thesis writing and/or informal reporting of preliminary data. After spring break the group will meet once or twice (depending on number of students) to practice oral presentations of completed research.

*Two readers knowledgeable in the area of the student's research topic to be chosen by the research honors committee and faculty advisers.

Physical Sciences

Faculty committee: J.-Y. Parlange, chair; S. Colucci, S. J. Mulvaney, R. L. Strawderman

The research honors program in physical sciences provides outstanding students with an opportunity to do independent research under the supervision of a faculty member in the departments of Agricultural and Biological Engineering, Food Science, Earth and Atmospheric Sciences, or Biometrics.

In addition to meeting the requirements of the college, the student is expected to:

- Identify a thesis adviser and thesis topic before the end of junior year.
- Work with the thesis adviser, prepare a budget and application form (due by the sixth week of senior year).
- Enroll in the program for a minimum of two semesters.
- Enroll in the appropriate departmental undergraduate research course for a total of at least six credits.
- Submit an outline of the thesis to the chair of the committee by the end of January (for a May graduation).
- Submit a draft of the thesis to the thesis adviser with sufficient lead-time for a revision to be prepared.
- Submit three copies of the thesis and names of recommended reviewers to the chair of the honors committee by three weeks before the end of classes in the semester in which graduation is expected.

There is no required format but the thesis is usually written in the form of a research journal article or a master's thesis.

Further details of the program can be obtained from the chair of the Physical Sciences Research Honors Committee.

Plant Sciences

Faculty committee: R. L. Obendorf, chair; I. A. Merwin, E. B. Nelson, F. S. Rossi

Students perform independent scientific research under the guidance of faculty members in fields of horticultural, agronomic, and soil sciences; plant biology; plant genetics and breeding; and plant pathology. For admission to the program, students must meet college requirements and submit to the Plant Sciences Honors Committee a project proposal (two to three pages) which includes a title; a brief background to the problem (justification and literature review); a clear statement of objective(s) and hypotheses to be tested; methodology and experimental plan, necessary space, equipment and supplies; and a project budget. The proposal must be accompanied by a letter from the faculty supervisor stating that he or she has approved the project plan and that its completion within the remainder of the student's undergraduate tenure is feasible.

Successful completion of the research honors program requires acceptance by the honors committee of two copies of a research report. The report should be written in the format of a research publication in the appropriate scientific field. The acceptable report must have been reviewed and corrected according to the recommendations of the research supervisor before the report is submitted to the honors committee. The report must be received by the honors committee at least two weeks before the last day of classes of the semester in which the degree is sought and must be accompanied by a letter from the research supervisor evaluating the research and, if appropriate, recommending graduation with distinction in research.

The research honors committee will review the report within one week and may accept it or return it to the student with specific recommendations for revisions. A suitably revised version must be submitted to the committee before the second day of the examination period. When the committee accepts an honors report, the chair will recommend to the associate director of academic programs and to the college registrar that the student be graduated with distinction in research. One copy of the accepted report will be returned to the student with review comments from the committee.

Social Sciences

Faculty committee: R. E. Ostman, S. Feldman, J. M. Conrad, S. Peters

Students are accepted into the social sciences research honors program of the College of Agriculture and Life Sciences after meeting all the criteria described above, after evaluation of the student's written application, and on approval of a detailed thesis proposal. The application and proposal are due no later than the third week of the first semester of the senior year. Each student is encouraged to begin working on this proposal with a prospective faculty thesis adviser during the junior year. The purpose of the proposal is twofold. First, it formalizes a plan of study and establishes a set of expectations between the student and his or her faculty adviser. Second, the Honors Committee reviews the proposal to determine whether it is consistent with honors thesis requirements and to make suggestions for improvement.

The proposal should be 5 to 10 typed, double-spaced pages and include the following:

- **Research Topic:** State the problem to be studied or the topic of interest. Review the relevant literature and the background of the problem or topic; include a more extensive bibliography.
- **Research Questions/Empirical Hypotheses:** Specify the questions to be answered or hypotheses to be tested empirically via collection of data and a mode of analysis accepted in the social sciences.
- **Research Methods:** Discuss the models to be constructed (if any), sampling procedures, data collection procedures (including measurement instruments and survey or experimental designs, if appropriate), and methods of analysis.
- **Expected Significance:** State what new knowledge or information is likely to be forthcoming and why it is important.

Faculty advisers must be members of the graduate faculty. Exceptions to this rule will be granted for persons with special expertise who are deemed capable of thesis supervision; exceptions will be granted pending petition to the Social Science Honors Committee. Students may register for honors credit directed by the faculty adviser in conjunction with a research honors project.

Distinction in research is awarded upon approval of the research honors thesis by the social science honors committee. The research should deal with a substantive issue in one of the fields in the social sciences. Both the results of the research and the methodology (or the argument by which the results were achieved) must be reported. Reviews of the literature, practical conclusions or applications, or broad characterizations of an area of inquiry may constitute part of the research report but are not themselves sufficient to count as research.

Honors theses should be written according to the form of any standard journal within the appropriate field. Three copies of the thesis must be submitted to the chair of the social science committee no later than three weeks before the last day of classes of the semester for which the degree is sought. A supporting letter from the faculty member supervising the work also must be submitted. The thesis will be independently reviewed and revisions may be required before the thesis is presented for final approval. Final approval of the thesis requires a majority vote of the honors committee.

INTERCOLLEGE PROGRAMS

The College of Veterinary Medicine may accept students who are then permitted to double-register in their seventh and/or eighth semester and complete requirements for the Bachelor of Science degree in the College of Agriculture and Life Sciences. Students should consult with the college registrar, 140 Roberts Hall, to ensure that degree requirements have been fulfilled.

Students who have been offered admission to the S. C. Johnson Graduate School of Management may take management courses in their senior year if approved by their college faculty adviser as part of their undergraduate program. These courses count toward the endowed college credits (maximum 55 without additional tuition charge). Students may consult with the college registrar, 140 Roberts Hall, to verify degree requirements and endowed credits earned.

Students in the Engineering Program in Agricultural and Biological Engineering are usually enrolled in the College of Agriculture and Life Sciences during the freshman and sophomore years and jointly enrolled in this college and the College of Engineering in the junior and senior years. Students pay the engineering college tuition during the senior year. The B.S. degree is awarded in cooperation with the College of Engineering. The curriculum is accredited by the Accreditation Board for Engineering and Technology.

The Department of Landscape Architecture offers a first professional degree curriculum in landscape architecture at both undergraduate (BSLA) and graduate levels (MLA I), as well as a second professional graduate degree program (MLA II). The curricula for both the undergraduate and graduate programs are accredited by the Landscape Architecture Accreditation Board, LAAB. The graduate program is cosponsored by the Department of Landscape Architecture in the College of Agriculture and Life Sciences and by the College of Architecture, Art, and Planning.

The Division of Nutritional Sciences is an intercollege unit affiliated with the College of Human Ecology and the College of Agriculture and Life Sciences. The nutrition, food, and agriculture major offers students in the College of Agriculture and Life Sciences the opportunity to focus their studies in human nutrition while obtaining a strong background in courses related to agriculture and the life sciences. Students in the biological sciences major may complete the program of study in human nutrition. Courses offered by the Division of Nutritional Sciences support many undergraduate programs in the College of Agriculture and Life Sciences including animal science, biological sciences, communication, food science, international agriculture, plant sciences, and rural sociology. Nutritional sciences courses count toward the undergraduate degree requirement for 55 credit hours of courses in Agriculture and Life Sciences.

The American Indian Program (AIP) is a multidisciplinary intercollege program consisting of academic, research, extension, and student support components. Course work is intended to enhance students' understanding of the unique heritage of North American Indians and their relationship to other peoples in the United States and Canada. Students are challenged by such topics as the sovereign rights of Indian nations and the contemporary relevance of Indian attitudes toward the environment. The program's instructional core consists of courses that focus on American Indian life from pre-contact times to the present and feature the perspectives of Native American people.

Research areas among faculty active in the program include Indian education, social and economic development, agriculture, environmental issues, history, sociology, language, literature and the arts, and cultural preservation. Extension and outreach efforts within the program seek to develop solutions to problems identified by Indian communities and to facilitate the application of institutional resources, research, and expertise to community needs.

The American Indian Program's Akwe:kon Press publishes *Native Americas,* a multidisciplinary journal that covers issues across the Western Hemisphere, and sponsors conferences, guest lectures, and forums on important local, national, and international issues. Akwe:kon, the American Indian Residence House, offers undergraduate students a living environment that promotes intercultural exchange.

The American Indian Program offers a concentration in American Indian Studies to undergraduate students in conjunction with their major defined elsewhere in the university. The concentration will be earned upon completion of five courses: American Indian Studies 100 (Indian America to 1890) and American Indian Studies 175 (Contemporary American Indian Issues), plus three other courses selected from the American Indian Studies course listing, for a total of at least 15 credits. Students choosing a concentration in American Indian Studies should obtain application materials from the AIP office in 450 Caldwell.

AIP also offers a graduate minor. Students interested in choosing the minor should contact Daniel Usner, American Indian Program, (607) 255–8402.

Science of Earth Systems (SES) major emphasizes the rigorous and objective study of the Earth system as one of the outstanding intellectual challenges of modern science and as the necessary foundation for the future management of our home planet. Within this program, Cornell's strengths across a broad range of earth and environmental sciences have been brought together to provide students with the tools to engage in what will be the primary challenge of the twenty-first century.

The major is available to students in the College of Agriculture and Life Sciences as well as students in the Colleges of Arts and Sciences and, as an option, Engineering. The SES major has its home in the Department of Earth and Atmospheric Sciences, which spans all three colleges, but relies on the collaboration of several departments across the university.

The SES curriculum provides strong preparation in mathematics, physics, chemistry, and biology during the freshman and sophomore years. In the junior and senior years, students take a set of common SES core courses and an additional set of advanced disciplinary or inter-disciplinary courses that build on the basic sequences. Graduates of Cornell's SES program are well prepared for graduate studies in the earth and environmental sciences. The SES major also provides an excellent background for students wishing to pursue careers, with or without advanced study, in environmental law and policy, and environmental protection. SES is also a good major for students wishing to teach earth and environmental science at the high school level, perhaps in conjunction with Cornell's Teacher Education in Agriculture, Mathematics, and Science (TEAMS) program.

See the Science of Earth Systems listing in the section on "Major Fields of Study" for complete information about the SES curriculum. For more information contact Professor Kerry H. Cook, Department of Earth and Atmospheric Sciences, khc6@cornell.edu, and visit the web site: www.geo.cornell.edu/ses/

The Comparative and Environmental Toxicology Program is an interdisciplinary intercollege program with research, teaching, and cooperative extension components coordinated by the Institute for Comparative and Environmental Toxicology (ICET). Courses are cosponsored by academic departments in several colleges of the university. A description of the program and general information is available from the director of the program through the ICET office, 213 Rice Hall, or at www.cfe.cornell.edu/icet. See also the Interdisciplinary Centers, Programs, and Studies section at the front of this catalog.

The Cornell Institute for Resource Information Systems (Cornell IRIS) is an interdisciplinary, inter-college unit affiliated with the Center for the Environment. The mission of Cornell IRIS is to advance the development and use of spectral and spatial information science and technology to benefit the environment. The Institute is comprised of three program areas in environmental resource inventory, remote sensing, and geographic information systems. A description of these programs and general information is available from the Institute director through the Cornell IRIS office in 302 Rice Hall.

OFF-CAMPUS STUDY PROGRAMS

Study off campus is of two types: (1) credit may be earned at another institution and transferred to Cornell, or (2) credit may be earned in Cornell courses that require off-campus activity.

Students who plan to enroll in courses at another institution in the United States must petition for a leave of absence. Courses

should be selected in consultation with the faculty adviser.

Albany Programs

Study off campus in Albany, the New York State capital, provides a unique opportunity to combine career interests with academic and legislative concerns. Three formalized opportunities are available. The Assembly Intern Program is offered in the spring semester and provides placement with a staff member of the New York State Assembly. The Senate Assistants Program also occurs during the spring semester and has placements with New York State senators and selected staff. The Albany Semester Program is available during the spring, summer, and fall semesters and provides experience with a state agency such as the Departments of Environmental Conservation, Education, or Labor. Each program has an academic component as well. Check the individual folders in the internship files in the ALS Career Development Office, 177 Roberts Hall.

Applications are collected and processed by the ALS Career Development Office, 177 Roberts Hall, in the term prior to assignments. Those accepted should plan a program of study in consultation with their faculty adviser. At least 12 credits must be carried to meet the residency requirement. To receive academic credit for the internship, students enroll in ALS 400, for an S-U grade only.

Information and applications are available in the ALS Career Development Office, 177 Roberts Hall.

Cornell-in-Washington

The Cornell-in-Washington Program offers students from all colleges in the university an opportunity to earn full academic credit for a semester in Washington, D.C. Students take courses from Cornell faculty, conduct individual research projects, and work as externs. The Cornell-in-Washington Program offers two study options: (1) studies in public policy, and (2) studies in the American experience. Students take part in a public policy or humanities seminar which requires them to serve as externs in federal agencies, congressional offices, or nongovernmental organizations and to carry out individual research projects under the supervision of Cornell faculty. The required externships and all course enrollments are arranged through, and approved by, the Cornell-in-Washington Program. Students in the College of Agriculture and Life Sciences must register for ALS 500 and cannot receive credit for the externship experience alone. For further information, see p. 21, inquire at 311 Caldwell Hall, 255–4090, or visit the Cornell-in-Washington web site at ciw.cornell.edu.

SEA Semester

The Sea Education Association is a nonprofit educational institution offering ocean-focused academic programs and the opportunity to live, work, and study at sea. Science, the humanities, and practical seamanship are integrated in small, personal classes. The 17-credit program is 12 weeks in length. Six weeks are spent in Woods Hole, and the following six weeks are spent on either one of SEA's two sailing vessels: the R/V Westward or the R/V Corwith Cramer. For more information, students should contact the Cornell Marine Programs office, G14 Stimson Hall (607–255–3717) or visit SEA's web site: www.sea.edu. ALS students should file an intent to study off campus form with the college registrar as early as possible to ensure proper registration and enrollment in courses.

Shoals Marine Laboratory

The Shoals Marine Laboratory, run cooperatively by Cornell University and the University of New Hampshire, is a seasonal field station located on the 95-acre Appledore Island off the coast of Portsmouth, New Hampshire, in the Gulf of Maine. SML offers undergraduates and other interested adults a unique opportunity to study marine science in a setting noted for its biota, geology, and history. Please refer to "Courses in Marine Science," under the section on the Office of Undergraduate Biology, for a list of courses offered.

For more information, contact the Shoals Marine Laboratory office, G14 Stimson Hall, 607–255–3717 or visit their web site: www.sml.cornell.edu.

Internships

Several departments in the college offer supervised internships for academic credit. Arrangements should be made with the offering department for assignment of a faculty member who will be responsible for planning the program of work and for evaluating student performance.

For internships not governed by an established internship course, the student must enroll in a 497 course for the number of credits to be assigned. If the work is done during the summer, the student must enroll in the Cornell summer session for the agreed-upon credits.

In cases where the work is not done at Cornell, the awarding of credits depends upon a prior contractual arrangement between a Cornell professor and the student. Specific terms for receiving credit and a grade should be recorded, using the Independent Study, Research, Teaching, or Internship form, available in the Registrar's Office, 140 Roberts Hall.

A maximum of 15 (pro-rated for transfer students) of the 120 credits required for the degree may be taken in internships, independent study courses, and undergraduate teaching or research. No more than 6 of the 15 credits allowed for independent study may be awarded for internships consisting of off-campus work experiences that do not have the continued presence of a Cornell faculty member. The six-credit allotment includes transfer credit and credit for internships in other colleges at Cornell. The six-credit limit does not apply to secondary, postsecondary, and cooperative extension teaching internships in the Department of Education.

The College of Agriculture and Life Sciences does not offer a field study option. In general, a rather narrow view is taken toward awarding academic credit for work experience, "life" experience, or apprenticeships. Credit will only be assigned or accepted in cases where a professor is directly involved in determining both the course content and in evaluating a student's work. The awarding of credit will not be allowed in cases where a student brings to the college or to a professor a description of a past experience and requests credit. All students enrolling for an internship must file an Independent Study, Research, Teaching, or Internship form with the Office of the College Registrar.

International Exchange Programs in The College of Agriculture and Life Sciences

Any student whose grade point average is 2.75 or above and has completed one year of continuous study in CALS may apply to a CALS international student exchange programs.

These undergraduate exchange opportunities are for **CALS students only**. For more information on programs and application process, see the CALS Study Abroad Adviser in 140 Roberts Hall or visit our web site www.cals/oap/advising/international/index.cfm.

Students who are interested in international study but not in one of the CALS programs must apply through **Cornell Abroad** in 474 Uris Hall. Please refer to the Cornell Abroad section of *Courses of Study*.

MAJOR FIELDS OF STUDY

The college curriculum consists of 20 major program areas that reflect the departmental academic effort in the college. Faculty curriculum committees in each area identify a sequence of courses appropriate to all students studying in that field. Courses of study are designed to provide systematic development of basic skills and concepts. Opportunity for concentration in an area of particular interest is usually available.

Programs are planned with considerable flexibility, allowing students to prepare for careers, graduate work, professional opportunities, and the responsibilities of educated citizens. Course requirements in each program area are different, but all students must meet the minimum distribution requirements of the college.

Agricultural and Biological Engineering

The Department of Agricultural and Biological Engineering addresses three great challenges facing humanity today: ensuring an adequate and safe food supply in an era of expanding world population; protecting and remediating the world's natural resources, including water, soil, air, biodiversity, and energy; and developing engineering systems that monitor, replace, or intervene in the mechanisms of living organisms. The undergraduate engineering program in the Department of Agricultural and Biological Engineering has a unique focus on biological systems, including the environment, that is realized through a combination of fundamental engineering sciences, biology, applications courses, and liberal studies. The program leads to a Bachelor of Science degree, which is awarded jointly by the Colleges of Engineering and Agriculture and Life Sciences, and is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET).

Two concentrations in Agricultural and Biological Engineering are offered: biological engineering and environmental engineering. Students take courses in mathematics, statistics, computing, physics, chemistry, basic and advanced biology, fundamental engineering sciences (mechanics, thermodynamics,

fluid mechanics, and transport processes), engineering applications, and design. Students select upper-level courses in the department in areas that include bioprocessing, soil and water management, bioenvironmental and facilities engineering, bioinstrumentation, engineering aspects of animal physiology, environmental systems analysis, and waste treatment and disposal. Students select other courses in the College of Engineering that strengthen their program, such as environmental engineering or biomedical engineering. Students planning for medical school also take additional lab-based courses in biology and organic chemistry. Throughout the curriculum, emphasis is placed on communications and teamwork skills. Students in the engineering program may pursue minors and options in specialized areas as noted in the engineering section of this publication. **Specific course requirements and other information for the Agricultural and Biological Engineering joint program are in the College of Engineering section of this publication.** Further information is available at the undergraduate program office, ABEN Student Services, 207 Riley-Robb.

The department also offers two technology programs: Biological Systems Technology and Environmental Systems Technology. The technology programs emphasize applied and technical aspects of biological, environmental, and agricultural sciences. These programs incorporate courses in basic biological and physical sciences and mathematics as well as engineering and technology, agriculture, business, social sciences, and liberal studies. The department also participates in the interdisciplinary major, Science of Earth Systems (SES). Students in the joint engineering program may minor in SES by taking 18 credits of engineering and science electives as part of their engineering program. Students in the technology program may participate in SES by completing the SES courses as part of their technology program. Students may pursue the SES major through any one of the cooperating departments as noted in the SES description on page 53. The student develops his or her own program of advanced and elective courses in consultation with a faculty adviser, and may minor in an area such as communication, business, education, or international agriculture.

Many undergraduate students participate in teaching assistantships, research assistantships, design teams, and study abroad. Students in the Engineering program are also eligible to do Engineering Co-Op. Students should have a strong aptitude for the sciences and mathematics and an interest in the complex social issues that surround technology.

Career opportunities cover the spectrum of private industry, public agencies, educational institutions, and graduate programs in engineering, science, medicine, law, and other fields. In recent years graduates have developed careers in environmental consulting, biotechnology, the pharmaceutical industry, biomedical engineering, management consulting, and international development.

The living world is all around us and within us. The biological revolution continues and it has given rise to a growing demand for engineers who have studied biology and the environment, who have strong math and science skills, who can communicate effectively, who are sensitive to the needs of people, and who are interested in the challenges facing society. The Department of Agricultural and Biological Engineering is educating the next generation of engineers to meet these challenges.

Specific course requirements for the Accredited Engineering Programs are found in the College of Engineering section of this book.

Specific course distribution requirements for the academic programs in Biological Systems Technology and Environmental Systems Technology include

		Credits
A.	*Basic Subjects*	
	1. Calculus	8
	2. Chemistry	6
	3. Physics	8
	4. Introductory biological sciences	6
	5. Computer programming	4
	6. Statistics or probability	3
	7. Written and oral expression	9
B.	*Advanced and Applied Subjects*	
	1. Five courses in the biological, environmental, or agricultural sciences	15
	2. Five engineering or technology courses at the 300 level or above; at least 9 credits in agricultural and biological engineering	15
C.	*Electives*	
	Additional courses to complete college requirements	
D.	*Total (minimum)*	*120*

For further details on the Agricultural and Biological Engineering and Technology Programs (including SES), see the department's Undergraduate Programs brochure, available at 207 Riley-Robb Hall; contact the advising coordinator, Professor Jim Bartsch, at 255–2800; or visit the department's web site at www.aben.cornell.edu.

Animal Sciences

The animal sciences program area offers a coordinated group of courses dealing with the principles of animal breeding, nutrition, physiology, management, and growth biology. Emphasis in subject matter is directed toward domestic animal species, dairy and beef cattle, horses, poultry, pigs, and sheep, while laboratory, companion, and exotic animal species are also included in research and teaching programs. The Animal Science Department has extensive facilities for animal production and well-equipped laboratories and classrooms, including a teaching barn, in which students can gain practical experience in the care and management of large animals.

The program focuses on the application of science to the efficient production of animals for food, fiber, and pleasure and easily accommodates a variety of interests and goals. Beyond a core of basic courses (suggested minimum, 15 credits) students select production and advanced courses to fulfill an individually tailored program worked out in consultation with their advisers. In this way it is possible to concentrate by species as well as by subject matter (nutrition, physiology, growth biology, breeding, management). For each subject area, supporting courses in other departments are readily available and strongly encouraged. Many science-oriented students elect a program emphasizing supportive preparation in the physical and biological sciences appropriate to graduate, veterinary, or professional study following graduation. Dairy management is a popular program among students who may be preparing to manage a dairy farm or enter a related career. Other students may elect a program oriented toward economics and business in preparation for a career in the poultry, dairy, meat-animal, horse, feed, or meats industry. These are examples of the flexibility within these programs that can be developed to meet a student's career interest related to animals.

It is recommended that students obtain appropriate fieldwork or animal experience during summers. Several special training opportunities exist for highly motivated students. Juniors and seniors whose academic records warrant it may, by arrangement with individual faculty members, engage in research (either for credit or Honors) or assist with teaching (for credit). The Dairy Management Fellows Program offers an equally challenging but different type of experience for a highly select group of students.

Applied Economics and Management

The undergraduate program in the Department of Applied Economics and Management (AEM) offers programs of study in three broad areas: Business, Agribusiness, and Applied Economics. Here you will find what will soon be only the second accredited undergraduate general business program in the Ivy League, as well as specializations focusing on the economics of agriculture and the environment.

Applied Economics and Management courses stress the application of analytical skills, critical thinking, and economic theory to real-world business and public-policy issues. Six areas of specialization are offered:

Business, one of the largest undergraduate majors at Cornell University, offers students a variety of courses that provide not only breadth, but also depth in most business fields, including finance, marketing, entrepreneurship, and general management.

Food industry management is designed for students interested in management positions with the processing, manufacturing, or distributions segments of the food industry, an industry that accounts for $1 out of every $3 in retail sales in the U.S.

Agribusiness management students study general business courses, including business management, marketing, accounting, and finance, as well as courses tailored to agricultural businesses.

Farm business management and finance, an agribusiness specialization, is designed for students interested in working for firms with ties to farming and agriculture, such as cooperatives, commercial banks, horticultural businesses, family farms, Farm Credit Services, and agribusiness firms.

Agricultural and applied economics is a broad-based specialization that focuses on such important national and international issues as the economics of policy, markets, production, international trade, and international development.

Environmental and resource economics is designed for students interested in the economics of such international issues as

water and air quality, waste management, rural-urban land use, the sustainability of natural resources, energy use, and global climate change.

AEM graduates are actively recruited by elite businesses for positions in finance, marketing, investment banking, and management consulting, as well as by federal and international agencies. Many graduates go on for advanced professional and academic degrees, often after several years in a challenging career position in business or government.

Atmospheric Science

Atmospheric Science is the study of the atmosphere and the processes that shape weather and climate. The curriculum emphasizes the scientific study of the behavior of weather and climate, and applications to the important practical problems of weather forecasting and climate prediction. Students develop a fundamental understanding of atmospheric processes and acquire skill and experience in the analysis, interpretation, and forecasting of meteorological events. All students are required to complete a minimum of three semesters of calculus, two semesters of physics, and a semester each of chemistry, computer science, and statistics.

Atmospheric science courses are offered through the Department of Earth and Atmospheric Sciences (EAS). There are two options for the B.S. in Atmospheric Science through the College of Agriculture and Life Sciences:

Option A

1. Mathematics, Computer Science, and Statistics:
   a. Math 190/191, 192, 293; or Math 111, 112, 213
   b. Computer Sci. 100, or EAS 150
   c. AEM (ARME) 210 or equivalent
   d. Math 294 (or MATH 221 and 222, without MATH 213) or EAS 435
2. Basic Physical Sciences:
   a. Physics 207, 208, or Physics 112, 213, 214
   b. Chem 103, 207, or 211
3. Atmospheric Science:
   a. EAS 131, 250, 341, 342, 352, 447, 451
   b. At least two atmospheric science electives

Option B

1. Mathematics, Computer Science, and Statistics:
   a. Math 190/191, 192, 293, 294; or Math 111, 112, 221, 222
   b. Computer Sci. 100, or EAS 150
   c. AEM (ARME) 210 or equivalent
   d. Math 321, Math 420, or T&AM 310
2. Basic Physical Sciences:
   a. Physics 112, 213, 214
   b. Chem 207 or 211
3. Atmospheric Science:
   a. EAS 341, 342, 352, 451

Option A is intended to meet the needs of students whose primary interests are in forecasting and operational meteorology. Upon graduation, a student who has completed Option A will have satisfied both the curricular guidelines of the American Meteorological Society and the educational requirements of the National Weather Service for employment as a meteorologist. They will also be well qualified for positions in private-sector forecasting, environmental consulting firms, and in broadcast meteorology. In addition, Option A provides good preparation for graduate work in atmospheric science and closely related fields.

Option B is designed to focus on preparation for graduate study in atmospheric as well as other sciences, and includes somewhat stronger coursework in mathematics and physics than does Option A. The minimum coursework in Option B does not satisfy the National Weather Service requirements or American Meteorological Society guidelines for employment in operational meteorology, but may be more appropriate for students with academic or research career goals. It can also be an attractive option for students transferring into the program as juniors.

Biological Sciences

Biology is a popular subject at many universities for a variety of reasons: it is a science that is in an exciting phase of development; it prepares students for careers in challenging and appealing fields such as human and veterinary medicine, environmental sciences, and biotechnology; and it deals with the inherently interesting questions that arise when we try to understand ourselves and the living world around us. Many of the decisions we face today deal with the opportunities and problems that biology has put before us.

The major in biological sciences is available to students enrolled in either the College of Agriculture and Life Sciences or the College of Arts and Sciences. The Office of Undergraduate Biology provides student services which are available to students from either college.

The biology major is designed to enable students to acquire the foundations in physical and life sciences necessary to understand modern biology and to pursue advanced studies in a specific area of biology. Programs of study include either general biology or one of the following concentrations: animal physiology, biochemistry, computational biology, ecology and evolutionary biology, genetics and development, molecular and cell biology, microbiology, neurobiology and behavior, nutrition, plant biology, and systematics and biotic diversity. Students interested in the marine sciences should consult the Shoals Marine Laboratory Office, G14 Stimson Hall, 255–3717, for academic advice and career counseling. For more details about the biology curriculum see the section in this catalog on Biological Sciences.

Biology & Society

The Biology & Society program area is designed for students who wish to combine the study of biology with exposure to perspectives from the social sciences and humanities. Many of the most critical social issues of our time, from the implications of genetic engineering to the impact of global climate change, have biological processes at their core. At the same time these issues are inherently social, involving complex relationships among people, institutions, laws, and beliefs. The Biology & Society field of study provides the skills and perspectives necessary to confront problems with biological, social, and ethical dimensions. In consultation with a faculty member, students are expected to select their courses in the field to meet their own goals and interests. For a description of the Biology & Society requirements and courses, see the section on Biology and Society under "Special Programs and Interdisciplinary Study" in this publication or visit the web site at www.sts.cornell.edu.

Students who elect Biology & Society as their major field of study leave Cornell with well-developed writing and analytical skills and a knowledge base that can lead to employment in a variety of fields. Many graduates have accepted positions as health counselors, writers, or policy analysts and researchers for government organizations, medical institutions, consumer or environmental groups, or scientific research institutes. Students have found that Biology & Society is also excellent preparation for professional training in medicine, law, and health services administration and for graduate programs in such fields as genetic counseling, nutrition, clinical psychology, public health, environmental studies, anthropology, sociology, and other related fields.

Admissions

Students must have completed a year of college-level biology and must submit an application during their sophomore year. Students in the College of Agricultural and Life Sciences may be admitted directly into the field of study when they apply to the college; as with all students admitted prior to completing the biology prerequisite, the admission is provisional. It is the student's responsibility to assure that final acceptance is granted upon completion of the introductory biology sequence. Although only introductory biology is a prerequisite for acceptance, students will find it useful to have completed some of the other requirements (obtain course checklist in 275 Clark Hall) by the end of their sophomore year. Juniors are considered on a case-by-case basis. Upper-division applicants should realize the difficulties of completing the biology and society requirements in less than two years.

The application includes:

- A one- to two-page statement explaining your intellectual interests in Biology & Society and why it is consistent with your academic goals and interests.
- A selected theme.
- A tentative plan of courses fulfilling Biology & Society requirements, including courses you have taken and those you plan to take.
- A transcript of work taken at Cornell University, current as of the date of application.

The faculty admissions committee reviews applications twice a year, once each during the fall and spring semesters. A faculty adviser is assigned on admittance to the field. Approximately 50 faculty members from five colleges serve as advisers to Biology & Society students. The major program is coordinated for students in all colleges through the Biology and Society Office, 275 Clark Hall, where students can get information, specific

course requirements, and application forms. Faculty and student advisers are available to discuss the Biology & Society requirements with you.

Requirements for the program are listed below. A full description and listings of courses that satisfy the requirements can be obtained in 275 Clark Hall or on the web at www.sts.cornell.edu. Also refer to the section on Biology & Society under "Special Programs and Interdisciplinary Study" in this publication.

Biology and Society Requirements:

- Introductory biology (101–104, 105–106, or 107–108)
- College calculus (one course)
- Ethics (one course)
- Two social sciences/humanities foundation courses
- Three biology foundation courses
- One biology depth course
- Statistics (one course)
- Core course
- Five theme courses (a coherent group of five courses relevant to the student's special interest in Biology & Society, including a senior seminar that serves as a capstone course for the program).

Students should develop their theme and select their courses in consultation with a member of the Biology & Society faculty. A list of faculty is available in 275 Clark Hall. Further information may be obtained by calling (607) 255–6047 or sending an e-mail message to msw8@cornell.edu.

I. First-Year Writing Seminars

Check the current FWS pamphlet for information.

II. Foundation Courses

A. Ethics (select one)

B&SOC 205 Ethical Issues in Health and Medicine (also S&TS 205)
Fall. 4 credits. Limited to 150 students. E. Toon.
For description, see B&SOC 205.

B&SOC 206 Ethics and the Environment (also S&TS 206 and PHIL 246)
Spring. 4 credits. Limited to 60 students. N. Sethi.
For description, see B&SOC 206.

B. Social Sciences/Humanities Foundation (2 courses, 1 from any 2 areas)

1. History of Science

[S&TS 233 Agriculture, History, and Society: From Squanto to Biotechnology
Fall. 3 credits. Not offered 2001–2002. M. Rossiter.
For description, see S&TS 233.]

S&TS 282 Science in Western Civilization (also HIST 282) #
Spring. 4 credits. P. Dear.
For description, see HIST 282.

[S&TS 283 The Sciences in the Twentieth Century (also HIST 280)
Spring. 4 credits. Not offered 2001–2002. M. Dennis.
For description, see S&TS 283.]

S&TS 287 Evolution (also BIOEE 207 and HIST 287)
Fall or summer. 3 credits. W. Provine.
For description, see BIOEE 207.

S&TS 355 Computers: From Babbage to Gates
Fall. 4 credits. M. Dennis.
For description, see S&TS 355.

[S&TS 390 Science in the American Polity: 1800–1960 (also GOVT 308, AM ST 388)
Fall. 4 credits. Not offered 2001–2002. M. Dennis.
For description, see S&TS 390.]

[S&TS 433 Comparative History of Science
Spring. 4 credits. Not offered 2001–2002. M. Rossiter.
For description, see S&TS 433.]

S&TS 444 Historical Issues of Gender and Science (also WOMNS 444)
Spring. 4 credits. M. Rossiter.
For description, see S&TS 444.

2. Philosophy of Science

S&TS 201 What is Science? An Introduction to the Social Studies of Science and Technology
Spring. 3 credits. T. Pinch.
For description, see S&TS 201.

S&TS 286 Science and Human Nature (also PHIL 286)
Spring. 4 credits. May be used to meet the philosophy of science requirement *if not* used to meet the core course requirement. R. Boyd.
For description, see PHIL 286.

S&TS 381 Philosophy of Science: Knowledge and Objectivity (also PHIL 381)
Fall. 4 credits. Limited to 30 students. R. Boyd.
For description, see PHIL 381.

3. Sociology of Science

B&SOC 301 Biology and Society: The Social Construction of Life (also S&TS 401)
Fall. 4 credits. Limited to 75 students. May be used to meet the sociology of science requirement if not used to meet the core course requirement. E. Toon.
For description and prerequisites, see B&SOC 301.

B&SOC 342 Sociology of Science (also S&TS 442, CRP 442 and SOC 442)
Fall. 4 credits. H. Mialet.
For description, see S&TS 442.

R SOC 208 Technology and Society
Fall. 3 credits. C. Geisler.
For description, see R SOC 208.

S&TS 201 What Is Science? An Introduction to the Social Studies of Science and Technology (also SOC 210)
Spring. 3 credits. T. Pinch.
For description, see S&TS 201.

S&TS 311 The Sociology of Medicine
Spring. 4 credits. E. Toon.
For description, see S&TS 311.

S&TS 411 Knowledge, Technology, and Property
Spring. 4 credits. S. Hilgartner.
For description, see S&TS 411.

[SOC 434 The Sociology of Reproduction (also WOMNS 435)
Spring. 4 credits. Not offered 2001–2002. Staff.
For description, see SOC 434.]

4. Politics of Science

B&SOC 406 Biotechnology and the Law (also S&TS 406)
Spring. 4 credits. L. Palmer.
For description, see S&TS 406.

[B&SOC 407 Law, Science, and Public Values (also GOVT 407 and S&TS 407)
Spring. 4 credits. Not offered 2001–2002. M. Lynch.
For description, see S&TS 407.]

CRP 380 Environmental Politics
Fall. 4 credits. R. Booth.
For description, see CRP 380.

S&TS 324 Environment and Society (also R SOC 324 and SOC 324)
Spring. 3 credits. L. Glenna.
For description, see R SOC 324.

S&TS 391 Science in the American Polity: 1960–Now (also GOVT 309 and AM ST 389)
Fall. 4 credits. M. Dennis.
For description, see S&TS 391.

[S&TS 427 Politics of Environmental Protection in America (also GOVT 427)
Fall. Not offered 2001–2002. 4 credits.
For description, see S&TS 427.]

5. Science Communication

COMM 260 Scientific Writing for Public Information
Fall or spring. 3 credits. Limited to 25 non-freshman or graduate students per section.
For description and prerequisites, see COMM 260.

[COMM 421 Communication and the Environment
Spring. 3 credits. May be used in the foundation only if **not** taken as a senior seminar. Not offered 2001–2002. J. Shannahan.
For description, see COMM 421.]

S&TS 285 Communication in the Life Sciences (also COMM 285)
Spring. 3 credits. Staff.
For description, see COMM 285.

S&TS 352 Science Writing for the Mass Media (also COMM 352)
Fall. 3 credits. Not open to freshmen. Limited to 25 students. B. Lewenstein.
For description and prerequisites, see COMM 352.

[S&TS 466 Communication of Science and Technology (also COMM 466)
Fall. 3 credits. May be used in the foundation only if **not** taken as a senior seminar. Limited to 15 students. Offered even fall semesters. Not offered 2001–2002. B. Lewenstein.
For description and prerequisites, see COMM 466.]

C. Biology Foundation (breadth requirement): Three courses: one from three of the following subject areas:

1. Biochemistry, Molecular and Cell Biology

BIOBM 330 Principles of Biochemistry, Individual Instruction
Fall or spring. 4 credits. J. Blankenship, P. Hinkle, staff.
For description and prerequisites, see BIOBM 330.

BIOBM 331 Principles of Biochemistry: Proteins and Metabolism
Fall. 3 credits. May not be taken for credit after BIOBM 330 or 333. G. Feigenson.
For description and prerequisites, see BIOBM 331.

BIOBM 333 Principles of Biochemistry, Lectures
Summer. 4 credits. H. T. Nivison.
For description and prerequisites, see BIOBM 333.

NS 262 The Cell and the External World
Spring. 3 credits. N. Noy.
For description and prerequisites, see NS 262.

NS 320 Introduction to Human Biochemistry
Fall. 4 credits. W. Arion and P. Stover.
For description and prerequisites, see NS 320.

2. Ecology

BIOEE 261 Ecology and the Environment
Fall or summer. 4 credits. Not open to freshmen. N. G. Hairston.
For description and prerequisites, see BIOEE 261.

3. Genetics and Development

BIOGD 281 Genetics
Fall, spring, or summer. 5 credits. Not open to freshmen fall semester. Limited to 200 students. P. Bruns.
For description and prerequisites, see BIOGD 281.

BIOGD 282 Human Genetics
Spring. 3 credits (2 cr. if taken after BIOGD 281). Limited to 25 per discussion group. M. L. Goldberg.
For description and prerequisites, see BIOGD 282.

4. Evolutionary Biology

BIOEE 278 Evolutionary Biology
Fall or spring. 3 or 4 credits. Limited to 300 students. M. A. Geber.
For description, see BIOEE 278.

5. Microbiology

BIOMI 290 General Microbiology Lectures
Fall, spring, or summer. 2 or 3 credits (2 credits if taken after BIOMI 192). S. Merkel, S. Winans, J. Helmann.
For description and prerequisites, see BIOMI 290.

6. Neurobiology and Behavior

BIONB 221 Neurobiology and Behavior I: Introduction to Behavior
Fall. 3, 4, or 5 credits. Not open to freshmen. P. Sherman.
For description and prerequisites, see BIONB 221.

BIONB 222 Neurobiology and Behavior II: Introduction to Neurobiology
Spring. 3 or 4 credits. Not open to freshmen. Each discussion limited to 20 students. A. Bass.
For description and prerequisites, see BIONB 222.

7. Botany

BIOPL 241 Introductory Botany
Fall. 3 credits. K. J. Niklas.
For description, see BIOPL 241.

8. Physiology and Anatomy

BIOAP 311 Introductory Animal Physiology, Lectures (also VETMED 346)
Fall. 3 credits. E. Loew and staff.
For description and prerequisites, see BIOAP 311.

NS 341 Human Anatomy and Physiology
Spring. 4 credits. Permission only. Must preregister for lab in 309 MVR during CoursEnroll. V. Utermohlen.
For description and prerequisites, see NS 341.

D. Biology Foundation (depth requirement): one course for which one of the above breadth requirement courses (2C) is a prerequisite.

E. Statistics (select one)

AEM (ARME) 210 Introductory Statistics
Fall. 4 credits. C. van Es.
For description and prerequisites, see AEM (ARME) 210.

BTRY 261 Statistical Methods I
Fall or summer. 4 credits. Note: BTRY 261 is limited to undergraduates. R. Lloyd.
For description and prerequisites, see BTRY 261/601.

CRP 223 Introduction to Statistical Reasoning for Urban and Regional Analysis
Fall. 3 credits. J. Lobo.
For description, see CRP 223.

ECON 319 Introduction to Statistics and Probability
Fall. 4 credits. Y. Hong.
For description and prerequisites, see ECON 319.

ILRST 210 Statistical Reasoning I
Fall, spring. 3 credits. Staff.
For description, see ILRST 210.

MATH 171 Statistical Theory and Application in the Real World
Fall, spring. 4 credits. Staff.
For description and prerequisites, see MATH 171.

PAM 210 Introduction to Statistics
Spring. 4 credits. K. Joyner.
For description, see PAM 210.

PSYCH 350 Statistics and Research Design
Fall. 4 credits. T. Gilovich.
For description, see PSYCH 350.

SOC 301 Evaluating Statistical Evidence (also R SOC 302)
Fall. 3 credits. Staff.
For description, see SOC 301.

III. Core Courses

B&SOC 301 Biology and Society: The Social Construction of Life (also S&TS 401)
Fall. 4 credits. Limited to 75 students. E. Toon.
For description and prerequisites, see B&SOC 301.

S&TS 286 Science and Human Nature (also PHIL 286)
Spring. 4 credits. R. Boyd and N. Sturgeon.
For description, see PHIL 286.

IV. Themes

A. Natural Sciences Issues/Biology Elective (two courses). Select from the following list of B&SOC approved Natural Science Issues courses or choose course(s) with introductory biology as a prerequisite.

[B&SOC 214 Biological Basis of Sex Differences (also BIOAP 214 and WOMNS 214)
Spring. 3 credits. Not offered 2001–2002; next offered spring 2003. J. Fortune.
For description, see BIOAP 214.]

[B&SOC 347 Human Growth and Development: Biological and Behavioral Interactions (also HD 347 and NS 347)
Spring. 3 credits. Offered alternate years. Not offered 2001–2002. J. Haas and S. Robertson.
For description and prerequisites, see HD 347.]

[BIOEE 275 Human Biology and Evolution (also ANTHR 275 and NS 275)
Fall. 3 credits. Not offered 2001–2002. K. A. R. Kennedy and J. D. Haas.
For description, see BIOEE 275.]

[BIOEE 474 Laboratory and Field Methods in Human Biology (also ANTHR 474)
Spring. 5 credits. Not offered 2001–2002. K. A. R. Kennedy.
For description, see BIOEE 474.]

[BIOEE 673 Human Evolution: Concepts, History, and Theory (also ANTHR 673)
Fall. 3 credits. Offered alternate years. Not offered 2001–2002. K. A. R. Kennedy.
For description, see BIOEE 673.]

BIOPL 247 Ethnobiology
Fall. 3 credits. D. M. Bates.
For description, see BIOPL 247.

HD 266 Emotional Functions of the Brain
Fall. 3 credits. R. DePue.
For description, see HD 266.

HD 344 Infant Behavior and Development
Fall. 3 credits. Not open to freshmen. S. Robertson.
For description and prerequisites, see HD 344.

HD 370 Adult Experimental Psychopathology
Spring. 3 credits. Limited to sophomores, juniors, and seniors. S. Bem.
For description and prerequisites, see HD 370.

HD 436 Language Development (also LING 436, PSYCH 436, and COGST 436)
Spring. 4 credits. B. Lust.
For description, see HD 436.

NS 222 Maternal and Child Nutrition
Fall. 3 credits. Limited to 20. C. Garza.
For description and prerequisites, see NS 222.

NS 331 Physiological and Biochemical Bases of Human Nutrition
Spring. 4 credits. May be used to fulfill the Biology Depth requirement. M. Stipanuk.
For description and prerequisites, see NS 331.

NS 361 Biology of Normal and Abnormal Behavior (also PSYCH 361)
Fall. 3 credits. Limited to juniors and seniors only. B. J. Strupp.
For description and prerequisites, see NS 361.

NS 452 Molecular Epidemiology and Dietary Markers of Chronic Disease
Spring. 3 credits. P. Cassano.
For description and prerequisites, see NS 452.

NS 475 Molecular Nutrition and Development
Spring. 3 credits. P. Stover and D. Noden.
For description and prerequisites, see NS 475.

NTRES 201 Environmental Conservation
Spring. 3 credits. T. Fahey.
For description, see NTRES 201.

PSYCH 326 Evolution of Human Behavior
Fall. 4 credits. R. E. Johnston.
For description and prerequisites, see PSYCH 326.

Examples of biology electives

AN SCI 300 Animal Reproduction and Development
Spring. 3 credits.
For description, see AN SCI 300.

HD 366 Psychobiology of Temperament and Personality
Spring. 3 credits. P. DePue.
For description, see HD 366.

NS 331 Physiological and Biochemical Bases of Human Nutrition
Spring. 4 credits. M. Stipanuk.
For description and prerequisites, see NS 331.

B. Humanities/Social Sciences Elective (two courses)

Courses listed earlier as social science/humanities foundation courses (2.B) are particularly appropriate as social science/humanities electives. A single course, however, cannot be used to meet both requirements. Additional courses that are recommended as social science or humanities electives are:

Examples of humanities/social sciences electives

AEM (ARME) 464 Economics of Agricultural Development
Spring. 3 credits. R. Christy.
For description, see AEM (ARME) 464.

[ANTHR 211 Nature and Culture @
Spring. 3 credits. Not offered 2001–2002. Staff.
For description, see ANTHR 211.]

CRP 380 Environmental Politics
Fall or spring. 4 credits. R. Booth.
For description, see CRP 380.

HD 251 Social Gerontology
Spring. 3 credits. D. Dempster-McLain.
For description, see HD 251.

NS 245 Social Science Perspectives on Food and Nutrition
Fall. 3 credits. J. Sobal.
For description, see NS 245.

NS 450 Public Health Nutrition
Spring. 3 credits. D. Pelletier.
For description, see NS 450.

NTRES 400 International Environmental Issues
Spring. 4 credits. R. McNeil.
For description, see NTRES 400.

NTRES 407 Religion, Ethics, and the Environment
Fall. 4 credits. R. Baer.
For description, see NTRES 407.

PAM 303 Ecology and Epidemiology of Health
Spring. 3 credits. E. Rodriguez.
For description, see PAM 303.

[PAM 380 Human Sexuality
Spring. 3 credits. Not offered 2001–2002. A. Parrot.
For description, see PAM 380.]

PAM 435 U.S. Health Care Systems
Fall. 3 credits. R. Battistella.
For description, see PAM 435.

PHIL 241 Ethics (by petition for breadth requirement)
Spring. 4 credits. N. Sturgeon.
For description, see PHIL 241.

[PHIL 368 Global Climate and Global Justice (also GOVT 468)
Fall. 4 credits. Not offered 2001–2002. Staff.
For description, see PHIL 368.]

R SOC 205 International Development (also SOC 206)
Spring. 3 credits. C. Geisler.
For description, see R SOC 205.

R SOC 220 Sociology of Health of Latinos and Ethnic Minorities (also LSP 220)
Fall. 3 credits. R. Parra.
For description, see R SOC 220.

R SOC 261 Sociology of Sustainable Development
Fall. 3 credits. L. Glenna.
For description, see R SOC 261.

[R SOC 490 Society and Survival
Fall. 3 credits. Not offered 2001–2002. Staff.
For description, see R SOC 490.]

S&TS 324 Environment and Society (also R SOC 324 and SOC 324)
Spring. 3 credits. L. Glenna.
For description, see R SOC 324.

[S&TS 453 Reflections on Scientific Personae: Visibility and Invisibility of the Body
Spring. 4 credits. Not offered 2001–2002. H. Mialet.
For description, see S&TS 453.]

S&TS 681 Philosophy of Science (also PHIL 681)
Spring. 4 credits. R. Boyd.
For description, see PHIL 681.

SOC 340 Health, Behavior, and Policy
Spring. 4 credits. S. Caldwell.
For description, see SOC 340.

C. Senior Seminars: Representative seminars listed below. Complete list available in 275 Clark Hall.

B&SOC 406 Biotechnology and the Law (also S&TS 406)
Spring. 4 credits. L. Palmer.
For description, see S&TS 406.

[B&SOC 427 Politics of Environmental Protection (also GOVT 427 and S&TS 427)
Fall. 4 credits. Not offered 2001–2002. Staff.
For description, see S&TS 427.]

B&SOC 447 Seminar in the History of Biology (also BIOEE 467, HIST 415, and S&TS 447)
Summer (6-week session). 4 credits. Limited to 18 students. W. Provine.
For description, see BIOEE 467.

B&SOC 461 Environmental Policy (also BIOEE 661 and ALS 661)
Fall and spring. 3 credits each term. Limited to 12 students. (Students must register for 6 credits each term since an "R" grade is given at the end of the fall term). D. Pimentel.
For description, see BIOEE 661.

[B&SOC 469 Food, Agriculture, and Society (also BIOEE 469 and S&TS 469)
Spring. 3 credits. Limited to 20 students. Not offered 2001–2002. A. G. Power.
For description, see BIOEE 469.]

COMM 421 Communication and the Environment
Spring. 3 credits. J. Shanahan.
For description, see COMM 421.

HD 418 Psychology of Aging
Fall. 3 credits. S. Cornelius.
For description, see HD 418.

HD 419 Midlife Development
Spring. 3 credits. S. Cornelius.
For description, see HD 419.

HD 366 Psychobiology of Temperament and Personality
Fall. 3 credits. R. A. DePue.
For description and prerequisites, see HD 366.

[HD 610 Processes in Human Development
Fall. 3 credits. Limited to 20 students. Not offered 2001–2002. U. Bronfenbrenner.
For description and prerequisites, see HD 610.]

HD 660 Social Development
Spring. 3 credits. Permission of the instructor required for undergraduates. C. Raver.
For description, see HD 660.

PAM 575 Housing and Long Term Care for the Elderly
Fall. 3 credits. P. Chi.
For description and prerequisites, see PAM 575.

[PAM 652 Health Care Services: Consumer and Ethical Perspectives
Fall. 3–4 credits. If using this course as a senior seminar, Biology & Society majors must take it for 4 credits. Enrollment limited; preference given to PAM students. Not offered 2001–2002. A. Parrot.
For description and prerequisites, see PAM 652.]

PAM 656 Managed Health Delivery Systems: Primary-Ambulatory Care
Spring. 3 credits. For undergraduate seniors only by permission of instructor. J. Kuder.
For description and prerequisites, see PAM 656.

PAM 659 Epidemiology, Clinical Medicine, and Management Interface Issues
Spring. 3 credits. E. Rodriguez.
For description, see PAM 659.

[R SOC 410 Population and Environment
Spring. 3 credits. Not offered 2001–2002. Staff.
For description, see R SOC 410.]

R SOC 438 Social Demography (also SOC 437)
Fall. 3 credits. D. Gurak.
For description, see R SOC 438.

R SOC 495 Population, Environment, and Development in Sub-Saharan Africa
Fall. 3 credits. P. Eloundou-Enyegue.
For description, see R SOC 495.

S&TS 411 Knowledge, Technology, and Property
Spring. 4 credits. S. Hilgartner.
For description and prerequisites, see S&TS 411.

S&TS 438 Minds, Machines, and Intelligence (also COGST 438)
Spring. 4 credits. H. Mialet.
For description, see S&TS 438.

[S&TS 466 Public Communication of Science and Technology (also COMM 466)
Fall. 4 credits. Limited to 15 students. Not offered 2001–2002. B. Lewenstein.
For description and prerequisites, see COMM 466.]

[S&TS 490 Integrity of Scientific Practice
Spring. 4 credits. Not offered 2001–2002. S. Hilgartner.
For description, see S&TS 490.]

S&TS 645 Genetics: Politics and Society in Comparative Perspective (also GOVT 634)
Spring. 4 credits. S. Hilgartner.
For description, see S&TS 645.

V. Other Courses

B&SOC 375 Independent Study
Fall or spring. 1–4 credits.
For description and prerequisites, see B&SOC 375.

[B&SOC 400 Undergraduate Seminar
Fall or spring. Variable credit. May be repeated for credit. Not offered 2001–2002.
For description, see B&SOC 400.]

B&SOC 498 Honors Project I
Fall. 3–5 credits. Staff.
For description and requirements, see B&SOC 498.

B&SOC 499 Honors Project II
Spring. 3–5 credits. Staff.
For description and requirements, see B&SOC 499.

Biometry and Statistics

Biometry is the application of mathematical and statistical techniques to the life sciences. Statistics is concerned with quantitative aspects of scientific investigation: design, measurement, summarization of data, and drawing conclusions based on probability statements. Students with ability in mathematics and an interest in its applications will find this a rewarding and challenging major.

The work of a statistician or biometrician can encompass research, teaching, consulting, and computing in almost any combination and in a wide variety of applications. Opportunities for employment are abundant in universities, government, and businesses ranging from large corporations to small consulting firms; salaries are usually excellent.

While satisfying course requirements for a major in biometry and statistics, students can also take a wide variety of courses in other disciplines. In fact, students are encouraged to take courses in applied disciplines such as agriculture, biology, economics, and the social sciences that involve numerical data and their interpretation.

Students majoring in this area are required to take a computer science course (e.g., Computer Science 100), mathematics courses (at least three semesters of calculus), Biometry and Statistics 100, 101, 102, 408–409, 421, 601–602, Industrial and Labor Relations 310, and Operations Research and Industrial Engineering 270. Experience gained through summer employment or work as an undergraduate teaching assistant is highly recommended. Students should contact Professor Steven J. Schwager for information.

Communication

The single most important thing to learn in college is how to assess and manage constantly changing information. The amount of information the public receives and is expected to understand is growing exponentially. Communication is taking a more central role in science, technology, business, and public policy. Increasingly, government, industry, and special interest groups rely on communication specialists to aid in managing information—collecting, sorting, interpreting or reinterpreting, summarizing, and making information understandable and accessible to the general public, to interest groups, and to decision makers in organizations. Effective information management requires a thorough understanding of the communication process.

Students who graduate from this department, have excellent speaking, writing, and listening skills. Communication majors are taught:

- Communication processes, such as how communication influences attitudes, opinions, and behaviors.
- How communication systems work in our society.
- How to apply their understanding of communication to solving problems in science, government, industry, health, and education.

The communication major is a program with a strong core of contemporary communication knowledge, theory, and practice. Required freshman courses are:

Fall semester:

COMM 120 Contemporary Mass Communication

COMM 121 Investigating Communication

Spring semester:

COMM 116 Communication in Social Relationships

COMM 117 Writing about Communication

This set of courses provides students with a basic understanding of communication and the communication process. These courses also provide a unique opportunity to link practical application (such as writing and critical analysis) with up-to-date research and knowledge about communication.

During the sophomore year, students take:

Fall semester:

COMM 201 Oral Communication

COMM 282 Communication Industry Research

Spring semester:

COMM 230 Visual Communication

After completing the courses in the core curriculum, all majors take an additional 12 credits in communication. Students can choose to concentrate in one of three focus areas:

- Communication in the Life Sciences. (Studies of the impact of communication on environmental, health, science, and agricultural issues, and public perceptions of risk.)
- Communication Planning and Evaluation. (Development of communication plans to solve problems for individuals or for organizations and evaluating the success of these plans.)
- Communication Systems and Technology. (Principles of how we use communication technologies and how we are influenced by these technologies.)

Detailed information on the distribution of courses is available from the department.

In designing the communication major, the faculty of the department has kept in mind the need for students to understand contemporary research-based knowledge about communication as well as their need to be competent communicators in the workplace and in society at large.

A minor in communication is pending. Please inquire if interested.

Crop and Soil Sciences

The Department of Crop and Soil Sciences provides instruction in three specializations: agronomy, crop science, and soil science. Employment opportunities are increased with practical experience, and the faculty of the department and the Career Development Office of the college are glad to help students search for relevant summer jobs and internship opportunities. Professional certification can also be obtained in these specializations.

Agronomy combines the study of crop production and soil management. It provides the student with a broad array of career opportunities after completion of the B.S. degree, including agricultural business, extension service work, and farming. Graduate school is also possible after a well-planned program. Students should take at least 12 credits of crops and 12 credits of soils and design the remainder of their curriculum to meet specific interests and goals. Some students pursue a major in agronomy with a concentration in international agriculture. Agronomy is also offered as a specialization within the plant sciences major field of study.

Crop science is the application of basic biological and ecological science to the improvement and management of the world's main field crops used for human food and livestock feed. Courses required include 18 credits of crops, 12 credits of plant biology, and 6 credits of soils. Students who anticipate a career in agricultural production or service after completion of the B.S. degree should take additional courses in economics, communication, plant pathology, entomology, and nutrition. Students planning graduate or professional study beyond the bachelor's degree should take advanced course work in organic chemistry and biochemistry, calculus, physics, and statistics. Crop science is also offered as a specialization within the plant sciences major field of study.

Soil science is a basic discipline important in ecology, engineering, agriculture, and conservation. The curriculum in soil science combines physical and biological training to address critical issues in environmental and agriculture management related to soils. Students take 18 credits in soil science, including four credits in the introductory course. In addition, chemistry, mathematics, physics, and microbiology are required, as well as six credits of crop science to satisfy the major. Soil science is also offered as a specialization within the Science of Earth Systems and the Environmental Science major fields of study.

Education

The Department of Education is currently redesigning its programs. Building on strong academic disciplines and grounding in socio-political, psychological, empirical and theoretical bases of educational practice, the department has two foci to meet societal demands for teachers of mathematics, science and agriculture and for leaders in non-formal educational settings: Teacher Education, and Adult and Extension Education. These two programs of study, largely at the graduate level, prepare leaders who will both engage in professional practice and improve educational processes through research, practice and scholarship. Our undergraduate program leads to provisional certification in agricultural education. The latest information on program developments may be found on our web site, http://ed.cornell.edu/education.

Adult and Extension Education. The purpose of the Adult and Extension Graduate Program of Professional Development is to promote social learning and civic engagement through participatory adult and extension education practice. Program coursework, research, and fieldwork integrate critical educational, philosophical, psychological, and sociological theories of democratic engagement of adult learners to support both domestic and international educational programs for sustainability in human and community development. As public universities focus a greater share of their research, teaching, and extension resources on critical environmental, economic, and social problems domestically and globally, the program provides opportunities for participants to examine who benefits from such efforts and in what ways. The program prepares educational scholars and professionals for leadership and activist roles in non-formal and community-based settings, including but not limited to adult education, agricultural education, adult literacy education, continuing education and staff development, domestic extension and community development, and international agricultural education and development. Using a reflective practice approach to professional development, graduate preparation includes the study of ethical, political, empirical, and theoretical bases of educational endeavors; analyses of current and historical practices in adult, extension, and international education; and the praxis of education in a global environment.

Programs of graduate study and professional development include:

Master's of Professional Studies (M.P.S.—Agriculture and Life Sciences) in Adult and Extension Education

The purpose of this program is to provide opportunity for professional development and graduate study for adult, extension, and international educators working in a variety of non-formal and community-based settings.

Master's of Science (M.S.) and Doctor of Philosophy in Education (Ph.D.) in Adult and Extension Education

The M.S. and Ph.D. programs of advanced graduate study are designed to provide intellectual and professional preparation of scholars and practitioners for faculty roles in higher education, leadership roles in non-formal and community-based educational agencies domestically and internationally, and activist roles in a variety of adult and extension education endeavors.

Teacher Education. The Teacher Education Program prepares teachers, teacher educators, and scholars in the areas of Agriculture, Mathematics, and Science. Students develop knowledge and expert practice skills to assume leadership positions in formal educational settings, including pubic and charter schools, private schools and other formal instructional centers. Through courses and field experiences, students gain knowledge of ethical practice, the teaching and learning process, and the social-political context of education, and integrate this with their specific content area of science, math, and/or agriculture. Building on the land-grant mission of Cornell, this program focuses on the improvement of public education through exemplary instruction, meaningful inquiry, and collaboration with public schools. Students become practitioners who have the intellectual resources and praxis to engage in educational practice that promotes engaged and informed citizens who participate in promoting positive social change.

Programs of professional development and graduate research studies include Teacher Education in Agriculture, Mathematics, and Science Program (TEAMS). The TEAMS Program prepares educational professionals who are recognized for the quality and significance of their teaching in the areas of Agriculture, Mathematics, and Science. The Program provides students with the opportunity to engage in coursework and field experiences that focus on the character and formation of cognitive abilities as well as subject matter expertise, critical and reflective thinking, the social context of schooling, the synthesis and communication of knowledge, professional development, and inquiry. Graduates of this program work in formal educational settings such as public and private schools, and in other areas where preparation in teaching and learning is highly desirable. There is also an Agricultural Education Undergraduate Certification Option (B.S.). Students enrolled in the undergraduate Education major or in one of the technical agriculture areas of the College of Agriculture and Life Sciences complete coursework in professional education in addition to their technical agriculture requirements. One semester of off-campus student teaching is required. Individuals who complete the Undergraduate Certification Option are eligible to apply for New York State provisional certification to teach agriculture in the public schools. Completion of a Master's degree within five years of graduation and two years of successful teaching are required for permanent certification.

Master of Arts in Teaching Certification Option (M.A.T.—Agriculture, Mathematics, and Science). Students enrolled in the M.A.T Certification Option complete a graduate curriculum of professional education, additional coursework in their content area(s), and one off-campus semester of student teaching. Graduates are eligible to apply for New York State provisional certification (grades 7–12) to teach one or more of the content areas emphasized in the program. Two years of successful teaching experience are subsequently required for permanent certification in New York State. Note that Undergraduates in science, mathematics, or agriculture majors should apply to the M.A.T program during their sophomore year. Students complete their undergraduate subject matter majors while taking selected courses in Education during their junior and senior years. Contact the TEAMS coordinator, 255–9573, for further information.

Master of Professional Studies—Non-Certification Option in Agricultural Education (M.P.S, Agriculture and Life Sciences). Students enrolled in the M.P.S Non-Certification Option in Agricultural Education complete a program of professional education, additional coursework in their technical content area(s), and an in-depth project. Graduates of this option work in formal educational settings that do not require state licensure (e.g., community colleges, private schools, industry), but do require a background in the planning, delivery, and assessment of instruction.

Graduate Studies in Curriculum and Instruction (Master of Science—M.S. and Doctor of Philosophy—Ph.D.). Graduate Studies in Curriculum and Instruction prepare scholars, researchers, and leaders in education who will work in colleges and universities, government agencies, foundations, and other institutions whose work is focused on formal education and its improvement. Graduates engage in disciplined inquiry addressing problems and issues of importance to the processes of teaching and learning and to the socio-political context in which schooling takes place. Each M.S. and Ph.D. student designs a program tailored to fit his/her personal and professional interests within the context of our Graduate Studies Program and its focus on teacher education. Applicants for the Ph.D. program should have teaching experience or comparable experiences in the public schools.

Effective College Teaching Series. The Center for Learning and Teaching, under the auspices of the Department of Education, offers a series of courses, both credit and non-credit, for the improvement of teaching at Cornell. Designed for Cornell faculty and graduate students who are either currently teaching or intending to teach. Contact the Center for Learning and Teaching, 5–6310, or www.clt.cornell.edu, for details.

Current offerings include:

EDUC 548 Effective College Teaching
Spring and one-week summer session. For faculty, and graduate students who intend to pursue an academic career. 1–3 credits.

EDUC 578 ITATP Cross-Cultural Classroom Dynamics, Language and Teaching Practicum
Fall and spring. For international graduate students who have, or will have, teaching assistantships. 2 credits.

ITATP follow-up course
Fall and spring. A non-credit course offered for international teaching assistants who have completed EDUC 578, but who need or desire continued work in classroom instructional and communication skills.

Graduate Teaching Development Workshops
Offered early in each fall and spring semester, this day-long series offers an array of workshops in teaching effectiveness, from teacher/student interactions to developing a teaching portfolio. Non-credit, open to all Cornell faculty and graduate teaching assistants.

EDUC 620 Internship in Education
Fall and spring. For CALS graduate teaching assistants or CALS teaching personnel who wish to extend their workshop experience through reflective practice and consultation with an instructional support specialist. Prerequisite: the CALS Graduate Student Professional Development Workshop. 1 credit.

Educational Leadership

The Institute for Community College Development (ICCD), a partnership with the State University of New York (SUNY), Cornell University, and community colleges is located in the Department of Education and draws on faculty with expertise in the personal and social competencies related to leadership. The Institute currently offers professional development for leaders in community colleges, a research program, and a course in leadership. Contact ICCD, (607) 255–9259, or on the web at iccd@cornell.edu for more information.

Current Offerings include:

Professional Development

The **Administrative Leadership Program** is designed for senior and mid-level administrators in academic, student affairs, professional, and foundation officers who are interested in current issues affecting community colleges and the way they operate their campuses. The three-day program is held during the summer at Cornell. The program includes opportunities for self-reflection and group problem-solving activities.

The **Great Teachers Seminar** and **Successful Teaching Conference** are designed for faculty interested in improving, learning about, and reflecting on their own theory and practice and on general principles of effective teaching and learning. The events are held in upstate New York in the spring and fall, respectively. Faculty from the Department of Education are frequent presenters.

The **Presidents Leadership Conference** is designed for current and future community college presidents who need information and ideas about leading a diverse, learning-centered campus that is connected to the local and global communities.

Research

The Institute research agenda is centered on leadership theory and practice, and on social and economic policies affecting education.

Education

EDUC 694 is a three credit course offered in the fall term. Analysis of Leadership Theories: Developing a Leadership Philosophy. Designed for faculty and administrators in higher education, particularly in the community colleges.

Entomology

The entomology curriculum provides students with a basic background in biological and environmental sciences, with a special emphasis on the study of insects. Majors may pursue graduate studies in entomology or related sciences upon completion of the B.S. degree. Alternatively, students may immediately begin careers in various aspects of basic or applied insect biology including integrated pest management, insect pathology, environmental assessment, medical or veterinary entomology, insect toxicology, apiculture, insect systematics, or insect ecology. Because of the diversity of career options, the major includes a common core of requirements allowing flexibility in electives selected by students in consultation with their advisers.

Specific requirements

Basic Sciences

- One year of college mathematics, including a course in calculus, may substitute statistics and biometry
- One semester of physics
- Chemistry 206–208 or 207–208 (General Chemistry)
- Chemistry 257 (Organic and Biological Chemistry)

General Biology

- Introductory Biology
- Biological Sciences 281 (Genetics)
- Biological Sciences 278 (Evolutionary Biology)
- A choice of one: Biological Sciences 261 (Ecology and the Environment) or Biological Sciences 330 or 331 (Principles of Biochemistry)

Entomology

- Entomology 212 (Insect Biology)
- A choice of two:
  - Entomology 322 (Insect Morphology)
  - Entomology 331 (Insect Systematics)
  - Entomology 483 (Insect Physiology)

Students must also enroll in at least two additional entomology courses offered at the 300–400 level on more specialized topics.

Environmental Science

Environmental Science is a new major for the College of Agriculture and Life Sciences that is pending approval. The proposed major provides an integrative and broad-based program in the physical, biological, and social sciences. The major consists of foundation courses and environmental core courses in earth, biotic, human, and economic systems. Students focus their upper-level study in a concentration or "environmental track," which provides expertise in a particular area. For more information about this new major, contact the Center for the Environment (cucfe@cornell.edu, or (607) 255–7535).

Food Science

The mission of the Food Science Program is to educate students for careers in food science and technology. Graduates are prepared for entry level positions in industry, government, and research organizations or for advanced study in food science and related disciplines. Food scientists qualify for satisfying careers which focus on ensuring the sustainable availability of a safe, nutritious, affordable, and high quality food supply for people throughout New York State, the nation, and the world.

Students choose one of five specialization options: (1) Basic Food Science; (2) Food Engineering; (3) Food Processing; (4) Food Operations and Management; and (5) Food Biotechnology. The first three options meet minimum curriculum standards set by the Institute of Food Technologists, the premier professional society for food scientists. Students choose an option based on individual interests and career goals.

The first two years of the program are focused on establishing a solid background in the physical and biological sciences, math, and communication. Required courses include chemistry (intro and organic), biology, microbiology, calculus, physics, freshman seminar, food science, and nutrition. The second two years emphasize the application of basic science and technology to the processing, storage, distribution, marketing, and final preparation of foods. Required courses include Food Engineering Principles, Physical Principles of Food Processing, Food Safety Assurance, Food Chemistry, Sensory Evaluation of Foods, Food Microbiology, and Statistics. Students choose electives to satisfy college distribution requirements and individual interests.

Students are strongly encouraged to participate in research supervised by a faculty member and/or to work as an intern in a food company during summer breaks. Most faculty in the department have active research programs and welcome participation by undergraduate students. Students may receive academic credit or wages for faculty-directed undergraduate research. Many food companies recruit on campus for their summer internship programs. These internships are excellent opportunities for students to gain experience and establish contacts for future employment.

A state-of-the art food processing and development laboratory, an operational dairy plant, and extensive laboratory facilities are available for training, research, and employment.

Landscape Architecture

Landscape Architecture focuses on the art of landscape design as an expression of the cultural values and the natural processes of the ambient environment. The program's unique place within the university promotes interaction among the areas of horticulture, environmental science, architecture, and city and regional planning.

The course of study prepares students for the practice of landscape architecture. The curriculum focuses on graphic communication, basic and advanced design methods, landscape history and theory, plant materials, construction and engineering technology, and professional practice. Design studios deal with

the integration of cultural and natural systems requirements as applied to specific sites at varying scales. Projects range from garden design, parks design, housing design, historic preservation, environmental rehabilitation, and urban design.

Landscape Architecture offers two professional degree alternatives: a four-year bachelor of science degree administered through the College of Agriculture and Life Sciences; a three-year Master of Landscape Architecture degree administered through the Graduate School for those who have a four-year undergraduate degree in another field. Both of these degrees are accredited by the Landscape Architecture Accreditation Board (LAAB) of the American Society of Landscape Architects. The major in each degree is composed of core courses related to professional education in landscape architecture, a concentration in a subject related to the core courses, and free electives.

The department also offers a two-year Master of Landscape Architecture Advanced Degree Program administered through the Graduate School, for those with accredited degrees in Landscape Architecture or Architecture. The two-year program entails core courses in the discipline and the development of a concentration in subject matter areas such as landscape history and theory, landscape ecology and urban horticulture, the cultural landscape, site/landscape and art, or urban design.

In addition, an undergraduate concentration in the American Cultural Landscape is available for nonmajors.

Dual Degree Options

Graduate students can earn a Master of Landscape Architecture and a Master of Science (Horticulture) or a Master of City and Regional Planning simultaneously. Students need to be accepted into both fields of study to engage in a dual degree program and must fulfill requirements of both fields of study. Thesis requirements are generally integrated for dual degrees.

Study Abroad

The faculty encourages study abroad and has two formally structured programs. The *Denmark International Study* (DIS) program is available primarily to senior undergraduates and third year graduates in the fall semester and is administered through Cornell Abroad. The *Rome Program* is made available to undergraduates and graduate students through the College of Architecture, Art, and Planning.

Bachelor of Science Landscape Architecture Degree Sequence: (Please note that each semester the studio classes require a supply and field trip fee and all landscape architecture majors are required to pay an annual technology fee.)

First Year

Fall Term	*Credits*
*LA 141, Grounding in Landscape Architecture	4
†Biological sciences elective	3
†Physical sciences elective	3
†Social sciences or humanities elective	3
†Written or oral expression elective	3
	16
Spring Term	
*LA 142, Grounding in Landscape Architecture	4
†Biological sciences elective	3
†Social sciences or humanities elective	3
†Written or oral expression elective	3
†Physical sciences elective	3
	16

Second Year

Fall Term	
*LA 491, Creating the Urban Eden: Woody Plant Selection, Design and Landscape Establishment	4
*LA 201, Medium of the Landscape	5
†Biological Sciences elective	3
†Social Sciences or Humanities elective	3
‡Free electives	2
	17
Spring Term	
*LA 202, Medium of the Landscape	5
*LA 315, Site Engineering I	3
*LA 492, Creating the Urban Eden: Woody Plant Selection, Design and Landscape Establishment	4
†Written or oral expression elective	3
†Physical sciences elective	3
	18

Third Year

Fall Term	
*LA 301, Integrating Theory and Practice	5
*LA 316, Site Engineering II (second 7 weeks)	2
**Concentration	3
*Historical studies	3
‡Free electives	2
	15
Spring Term	
*LA 302, Urban Design in Virtual Space	5
**Concentration	3
*Historical studies	3
*LA 318, Site Construction	5
	16

Fourth Year

Fall Term	
**Concentration	6
†Social sciences or humanities elective	3
‡Free elective	2
(Optional landscape architecture study abroad semester in Denmark or Rome)	11
Spring Term	
*LA 402, Integrating Theory and Practice: Community Design Studio	5
**Concentration	3
*LA 412, Professional Practice	1
‡Free elective	2
	11
Summary of credit requirements	
*Specialization requirements	58
†Distribution electives	39
‡Free electives	8
**Concentration	15
	120

Master of Landscape Architecture (M.L.A.) License Qualifying Degree

Requirements of the three-year M.L.A. curriculum include 90 credits, six resident units of satisfactory completion of the core curriculum courses, and a thesis or a capstone studio. (Please note that each semester the studio classes require a supply and field trip fee and all landscape architecture majors are required to pay an annual technology fee.)

First Year

Fall Term	*Credits*
*LA 505, Graphic Communication I	3
‡Free electives	2
*LA 501, Composition and Theory	5
*Historical Studies	3
*LA 491, Creating the Urban Eden: Woody Plant Selection, Design and Landscape Establishment	4
	17
Spring Term	
*LA 502, Composition and Theory	5
*LA 492, Creating the Urban Eden: Woody Plant Selection, Design and Landscape Establishment	4
**Concentration	2
*LA 615, Site Engineering I	3
*LA 590, Theory Seminar	3
	17

Second Year

Fall Term	
*LA 601, Integrating Theory and Practice	5
*LA 616, Site Engineering II	2
*Historical Studies	3
**Concentration	6
	16
Spring Term	
*LA 602, Integrating Theory and Practice	5
*LA 618, Site Construction	5
*Historical Studies	3
**Concentration	3
	16

Third Year

Fall Term

*LA 701, Urban Design and Planning	5
‡Free elective	3
**Concentration	4
	12

Spring Term

*LA 800, Master's Thesis in Landscape Architecture	9
or *LA 702, Advanced Design Studio	5
*LA 412, Professional Practice	1
‡Free elective(s)	2 or 6
	12

Summary of credit requirements

*Specialization requirements	64 or 68
**Concentration	15
‡Free electives	7 or 11
	90

Master of Landscape Architecture Advanced Degree Program. The two-year Master of Landscape Architecture (M.L.A./A.D.) program serves to broaden and enrich undergraduate education in design by providing an expanded educational experience to those who are technically skilled. Applicants must hold a Bachelor's Degree in Landscape Architecture or Architecture from an accredited program. The objective of the two-year (M.L.A./A.D.) program is to develop specializations for individuals who may wish to teach, practice, or conduct applied research in landscape architecture.

Students admitted to the two-year M.L.A./A.D. program are required to complete 60 credits of course work as approved by the members of their graduate committee. For landscape architects, this must include at least two advanced studios, a graduate seminar, a concentration, and a thesis. For architects the curriculum requires three advanced studios, two courses in plants and planting design, two courses in the history of landscape, two courses in site engineering, a seminar in design theory, a course in professional practice, a concentration, and electives.

Undergraduate Concentration for Nonmajors

Students outside the professional program may choose the undergraduate concentration in the American Cultural Landscape to complement their major. The courses center on the landscape as an object, something to be studied for its own sake, and as a subject, as a means to understand society and its relationship to natural systems and diverse cultures. The cultural landscape includes its visible elements as well as perceptions and cultural ideas and values. The concentration consists of four courses, two required and two electives. Students may petition to substitute one course in the electives list. Direct inquiries to professors H. Gottfried or S. Baugher.

Required.

Visual Studies (choose one):

Art 121 Introduction to Painting (3 cr)

Art 141 Introduction to Sculpture (3 cr)

Art 151 Introduction to Drawing (3 cr)

Art 158 Conceptual Drawing (3 cr)

Art 159 Life and Still-Life (3 cr)

Art 161 Photography I (3 cr)

DEA 101 Design I: Fundamentals (3 cr)

LA 141 Grounding in Landscape Architecture (3 cr)

The Landscape

+LA 282 The American Landscape (3 cr)

Electives (choose two):

Arch 390 American Architecture and Building I (3 cr.)

Arch 391 American Architecture and Building II (3 cr.)

+LA 260 Pre-Industrial Cities and Towns of North America (3 cr) offered alternate years

+LA 261 Urban Archaeology (3 cr)

+LA 262 Laboratory in Landscape Archaeology

LA 263 American Indians, Planners, and Public Policy (3 cr)

LANAR 525 History of American Landscape Architecture (3 cr)

LA 569 Archeology in Preservation Planning and Design (3 cr) offered alternative years

+Distribution Elective

Natural Resources

As the number of humans living on the Earth surpasses six billion at the start of the twenty-first century, knowing how to conserve and manage well our Earth's remaining biological resources and natural environments takes on increasing importance and urgency. The undergraduate curriculum in natural resources provides students with the concepts and tools needed to understand the Earth's environmental resources and ecological systems, and to participate with intelligence and foresight in their conservation and management. The department's program allows students flexibility to pursue a variety of paths to an integrated, broadly-based understanding of relationships of organisms to their environments, and ways in which humans affect, and are affected by, those relationships. Students are encouraged to understand the scientific, ethical, and societal basis for management and protection of natural resources and environments through the application of ecological principles and knowledge of societal needs.

The Future for Natural Resource Majors

Most students entering the department have a strong interest in the natural world and contributing in some way to greater harmony between humans and the environment. An undergraduate degree in natural resources prepares students to make these contributions as informed citizens with a strong liberal arts education and a firm grasp of the scientific, ethical, and societal dimensions of environmental conservation and management. It also prepares them for entry-level positions with conservation organizations, state and federal resource management agencies, environmental consulting firms, and environmental education centers, or for graduate study in several environmentally-related fields, including the biological, physical, and chemical sciences; forest, wetland, stream, wildlife, or fisheries management; and environmental law and public policy.

Because high-level positions in environmental fields usually require advanced study, most career-minded natural resource majors eventually pursue graduate or professional degrees. These students will assume positions of leadership in government, colleges and universities, national and international conservation organizations, environmental design firms, environmental consulting firms, the environmental divisions of private industry, and organizations involved in environmental education or communication.

Curriculum

Freshmen and sophomores all take a similar set of courses, many of which fulfill distribution requirements in the College of Agriculture and Life Sciences. These include courses in general biology and ecology, chemistry, mathematics, statistics, ethics, economics, and communication. They also take a series of four foundation courses designed to introduce them to the field of natural resources and environment. These courses include "Introduction to the Field of Natural Resources," "Environmental Conservation," "Field Biology," and "People, Values, and Natural Resources."

At the *junior and senior level*, students may specialize in one of three areas of concentration (see below). Within these concentrations, students take a prescribed number of courses from specified sets selected by the faculty to provide an in-depth understanding of key principles, concepts, and practices. They also have flexibility to gain exposure to a wide variety of environment-related courses offered by Natural Resources and other departments at Cornell, as well as to the University's many offerings that ground the student in a first-rate liberal arts education. All seniors participate in a senior experience, which they select from a number of departmental options. These options range from a research honors thesis to a senior field practicum or internship. They provide the student with an intensive experience in synthesis, integration, and critical thinking applied to current issues in the conservation and management of natural resources, ecological systems, or the environment.

Areas of Concentration

The concentration in **Applied Ecology** is designed as a foundation for those who wish to pursue careers or advanced study in science-based conservation or management of wild populations of animals and plants, conservation biology, control of invasive and overabundant species, watershed and landscape management, quantitative resource management, resource inventory and information management, global ecology, or applied ecology, and biogeochemistry of forests and wetlands. This concentration also may interest students seeking a biologically based approach to environmental science or global studies. Students who select this concentration typically focus their course work in the areas of species biology and applied ecosystem ecology, including quantitative analysis of fish and wildlife populations, ecosystems, and landscapes. They complement their course work within the department with courses in other departments, such as Ecology and Evolutionary Biology, Microbiology, Geology, Crop and Soil Sciences, Atmospheric and Earth Sciences, and Plant Sciences.

The concentration in **Resource Policy and Management** provides a foundation for students who wish to pursue careers or advanced study in the human dimensions or policy aspects of resource conservation and management. Students who select this concentration typically focus on courses related to the development of environmental policy, management strategies for particular species or ecosystems, or programs in environmental communication and education. They complement their course work within the department with courses in other departments such as Government, Rural Sociology, Communication, Applied Economics and Management, City and Regional Planning, and Policy Analysis and Management.

The concentration in **Environmental Studies** is intended for those who wish to obtain the broadest possible, yet rigorous, grounding in the wide range of subjects needed to understand human interactions with the environment. The program's emphasis is on developing an ability to think critically about these interactions. As juniors and seniors, students who choose Environmental Studies design a cohesive sequence of five courses in the social sciences, natural sciences, and humanities related to environment. Together with their departmental adviser, they decide on an environmental theme that the student wishes to pursue in depth. That theme should identify a specific set of interrelationships between humans and the environment that the student wishes to understand. For example, students could choose to explore themes such as evaluating legal and economic incentives for conservation or studying human views of the environment as expressed in literature or history. Many upper-division sequences of courses are acceptable if the student can formulate and defend a reasonable rationale for the choice of courses.

For details about the core curriculum in the Department of Natural Resources, consult our Web site at www.dnr.cornell.edu. Information also is available in the department's Undergraduate Program Office in 12 Fernow Hall.

Research and Work Opportunities for Undergraduates

The department offers many opportunities for field-oriented studies, independent research, internships, and jobs. These opportunities include several field-based courses and access for research to the department's Arnot Teaching and Research Forest near Ithaca, the Little Moose Field Station in the Adirondacks, and the Cornell Biological Field Station on Oneida Lake near Syracuse, as well as numerous natural areas near campus. Students also may choose to do independent research or work during the summer at the Hubbard Brook Forest in New Hampshire, New York's Adirondack Park, or in many types of forest, aquatic, and wetland ecosystems in New York and beyond where departmental faculty members have on-going research projects. Part-time jobs in the research and extension programs of several faculty members offer students many opportunities for career-related work experience. A research honors program is available for qualified students. In addition, the department coordinates an internship program for students and encourages students to seek relevant work experience to complement their academic studies.

Nutrition, Food, and Agriculture

Nutritional sciences draws upon chemistry, biology, and the social sciences to understand complex relationships among human health and well-being, food and lifestyle patterns, food and agricultural systems, and social and institutional environments.

The program in nutrition, food, and agriculture provides students with strong training in human nutrition in the context of an understanding and appreciation of the agricultural and life sciences. The program responds to the growing and important interrelationships of human nutrition and the agricultural and life sciences. Growing public interest in health and nutrition has placed new demands upon food producers, processors, and retailers. The problems of hunger and malnutrition in the United States and abroad require that nutritionists work together with specialists in areas such as agricultural economics, food production, and rural sociology. Advances in biotechnology provide researchers with new ways to understand human nutritional requirements and the regulation of human metabolism.

Nutrition, food, and agriculture majors complete a core set of requirements and choose elective courses in the areas of their particular interest. The core curriculum includes introductory chemistry and biology, organic chemistry, biochemistry, physiology, and mathematics. Students complete five courses in nutritional sciences: NS 115 Nutrition and Health: Concepts and Controversies, NS 245 Social Science Perspectives on Food and Nutrition, NS 345 Nutritional and Physicochemical Aspects of Foods, NS 331 Physiological and Biochemical Bases of Nutrition, and NS 332 Methods in Nutritional Sciences. In addition, students select a minimum of three advanced courses in nutritional sciences as well as elective courses in the broad areas of food production and processing, food and agricultural policy, the life sciences, environment and natural resources, communication, and education.

All majors have faculty advisers in the Division of Nutritional Sciences with whom they meet regularly. Advisers help students plan course schedules and help find opportunities for special study or experiences outside the classroom.

Many students engage in laboratory or field research with a faculty member for academic credit. The research honors program is designed for academically talented students who are interested in research. Honors students conduct independent research projects under the guidance of a faculty member and prepare an honors thesis. Many students participate in field experiences for credit during the academic year or summer. Placements in laboratories, industries, or community agencies are possible.

The major in nutrition, food, and agriculture can lead to many different career paths. By supplementing the core requirements with courses in different areas, students can prepare for jobs in industry, government, or community agencies in the United States or abroad. The major is excellent preparation for graduate study in a variety of fields.

The Division of Nutritional Sciences is affiliated with both the College of Agriculture and Life Sciences and the College of Human Ecology. Most of the Division faculty members work in Savage-Kinzelberg Hall and Martha Van Rensselaer (MVR) Hall. In addition to housing offices, classrooms, and seminar rooms, these buildings contain research facilities, specialized laboratories, a human metabolic research unit, and computer facilities. The nutritional sciences Learning Resource Center in MVR is used by students for study and small group discussion. The center contains class materials, computers, audio-visual aids, and supplementary books and periodicals for independent study and special projects.

For additional information about the nutrition, food, and agriculture program, contact the Division of Nutritional Sciences Academic Affairs Office, 335 MVR, 607–255–2628.

Plant Sciences

Plant Science is a multidepartmental program governed by faculty in the Departments of Crop and Soil Sciences, Horticulture, Plant Biology, Plant Breeding, and Plant Pathology. Students in the program share a common interest in learning about topics associated with plant growth and development in the broadest sense, and many have their sights set on careers in applied agricultural fields. In addition to the college distribution requirements, they must take at least one course in each of several areas including botany, plant physiology, ecology, taxonomy/systematics, genetics, statistics, plant-pest interactions, crop production, and soil science for a total of 40 credits.

Students who begin with well-defined interests or who identify certain areas of interest after several semesters of course work usually choose a specialization within one of the six cooperating departments. Each specialization has additional requirements beyond the basic core courses. However, students who are uncertain about the breadth of their interests or who are seeking as much flexibility as possible may choose to design their course of study without declaring a specialization. Those students have fewer required courses but are still expected to develop a strong background in plant science.

More than one hundred courses that deal directly with some area of plant science are offered by the cooperating departments, and other courses relating to plant science are offered elsewhere in the university. There are also ample opportunities for undergraduate teaching and research experience, and qualified students, especially those expecting to go on for graduate degrees, are encouraged to avail themselves of such opportunities. Students who are planning to enter the work force immediately upon completion of the B.S. degree are encouraged to obtain practical experience. This may involve summer employment in a plant production or maintenance related industry such as a lawn and tree care company, commercial greenhouse, nursery, botanical garden or arboretum, crop production farm or with Cooperative Extension. Plant Science faculty also encourage students to avail themselves of opportunities to work and/or study abroad.

In addition to classrooms and laboratories in five buildings on the Cornell campus proper, research and teaching facilities adjacent to the campus provide students with ample opportunities for hands-on practice, technical training, independent research projects, and internships in plant science. Facilities available

to students include research orchards and vineyards, golf courses and a turf research facility, the Cornell Plantations, Arboretum and natural areas, two vegetable crop farms. Demonstration/research facilities in Aurora (Cayuga County), Geneva (Ontario County), Highland (Ulster County), Lake Placid (Essex County), Middletown(Orange County), Odessa (Tioga County), and Riverhead, (Suffolk County) are also sites administered by departments in the Plant Science consortium and are available for undergraduate and graduate field study.

Crop Science and Agronomy are specializations that focus on the science and management of the major food crops of the world such as wheat, corn, rice, soybean, and alfalfa. In addition to several courses in Crop Science, students in this program also take courses in the sister disciplines of weed science, seed science, and soil science. At present, the specialization is described in detail under the major field of study called Crop and Soil Sciences, but it will become a part of the Plant Science major field of study in the near future.

Horticulture. Derived from the Latin word "hortus," meaning garden, horticulture is a blend of science and culture involving knowledge of plants in farms and gardens, parks and landscapes, athletic and recreational facilities, indoor plants, greenhouse and nursery plant production, and crops used for wines, herbs and spices, medicinal purposes, coffee and teas. The knowledge and skills essential to grow, maintain, process and market horticultural plants are in high demand in a world increasingly concerned with environmental quality, recreation, and health.

There are about 40 faculty members in horticulture–specializing in almost every aspect of horticultural science, with active research and outreach programs regionally, nationally and internationally.

Students choosing a concentration in Horticulture must complete the minimum 40-credits of core courses for the Plant Science major, plus the following courses:

HORT 101-Horticultural Science and Systems (4 credits)

HORT 400-Plant Propagation (3 credits)

Two HORT courses in plant production or management at the 400 level (6 credits).

One additional course of integrated pest management (plant pathology, entomology or weed science) beyond the 3-credit Plant Science core requirement (3 credits).

Students transferring into Cornell from other colleges can petition to waive or adjust these requirements, in consultation with their faculty advisers.

Plant Biology stresses a basic, rather than applied, understanding of how plants function, grow and develop, as well as a study of their genome, evolution and relationships to man. It provides undergraduates with a thorough preparation for graduate study in plant sciences. In cooperation with an adviser each student plans a curriculum with a concentration in basic sciences, supplemented by more advanced courses in plant biology. Students specializing in Plant Biology within the Plant Science major should take a minimum of four courses beyond the core of Plant Science courses. Options include plant molecular biology, plant cell biology, biochemistry, ethnobotany, and further courses in the function, growth, genetics, systematics, ecology and evolution of plants. Individual research under professorial guidance is encouraged. Different options within Plant Biology afford a flexible curriculum.

Plant Genetics and Breeding relates information about genetics/genomics of plants to the improvement of cultivated plant species. Agriculturally important genes are identified, characterized and deployed through combinations of molecular studies and sexual crosses. This area of study integrates genetic information with plant physiology/biochemistry, plant pathology, entomology, conservation biology, international agriculture, and related areas in order to create crops that meet the needs of modern society. In addition to the core plant science courses, students should take PLBR 201, 401, 403, and 404. Other courses may be included after consultation with the adviser. Students are encouraged to participate in research projects and take advantage of opportunities for internships in industry.

Plant Pathology is the study of plant disease—its causes and how they are identified, the molecular basis for pathogenicity and resistance, and disease management. For most students, a concentration in plant pathology as an undergraduate is preparation for graduate study in plant pathology or another field of plant science. However, study in plant pathology also prepares students for careers as technical representatives with agribusiness firms, Cooperative Extension educators, integrated pest management practitioners, state or federal plant pest regulatory agents, and laboratory technicians. Suggested courses beyond the plant science core include organic chemistry and biochemistry, calculus, introductory plant pathology, plant disease diagnosis, mycology, entomology, and plant breeding.

Plant Protection is offered to students who are interested in the management of plant pests. It includes the study of insects, diseases, weeds, vertebrate pests, and other factors that prevent maximum crop production. Although designed as a terminal program for students desiring practical preparation for careers in pest management, the specialization can also provide an adequate background for graduate work in entomology, plant pathology, or weed science.

Rural Sociology

Technological, economic, demographic, and environmental changes are social processes, and each has major impacts on individuals, social groups, societies, and the international order. At Cornell, rural sociology students study these and other facets of social change in both domestic and international settings. Among the topic areas in which faculty members in the Department of Rural Sociology specialize are international agricultural and rural development, community and regional development and changes in the United States, environmental sociology, aging and the life course, sociology of agriculture, rural industrialization and labor markets, technology and social change, population and development, political economy, women in development, race and ethnic relations, and research methodology. Most courses provide background in both domestic and international aspects of the subject matter. Normally, students will develop a specialization with either a domestic or international emphasis by choosing appropriate elective courses. All students learn the theory and methodology of sociology, and how to apply both to research and policy in their subject areas.

Recognizing that students are concerned with future career opportunities, the undergraduate program emphasizes acquisition of skills as well as general knowledge in preparation for jobs or further study upon graduation. Accordingly, students are expected to become involved in the application of theory, methodology, principles, and concepts in the analysis of practical problems.

Rural sociology offers degree programs at both the undergraduate and graduate levels (B.S., M.S., M.P.S., or Ph.D.). These programs are offered through the Department of Rural Sociology and the Graduate Field of Development Sociology, both of which are located in Warren Hall. For many years, the department and graduate field have been recognized as among the top programs in the country, and both are known for innovative program orientations. The department is particularly well known for providing instruction in international as well as domestic aspects of community and rural development, environmental sociology, sociology of agriculture, population studies, and other topics. Faculty members in this department are committed to both quality instruction and research programs. Being located in a college of agriculture, faculty members maintain strong ties to the technical fields within the college as well as with the International Agriculture Program, the Biology and Society Program, the Cornell Institute for Social and Economic Research, the Community and Rural Development Institute, the Gender and Global Change Program, the Life Course Institute, the Rural Development Program, the Hispanic Studies Program, the Program on Science, Technology, and Society, and the Center for International Studies. Nearly half of the department faculty are associated with one or more area studies programs (the Southeast Asia Program, South Asia Program, Latin American Studies Program, East Asia Program, or the Institute for African Development). Department members also maintain working relations with faculty in the Department of Sociology and other social science units located in other colleges at Cornell. Students are encouraged to supplement their course work by electing courses in these other departments and programs, thereby rounding out their educations with different perspectives.

The courses offered in rural sociology can be grouped into three broad categories: development sociology; population, environment, and society; and social data and policy analysis. All students majoring in rural sociology are required to take five core courses: an introductory course (R SOC 101), methods (R SOC 213), theory (R SOC 301), social stratification (R SOC 370), and a course in statistics. Four elective Rural Sociology courses are also required of all majors.

The focus area in development sociology provides an understanding of the processes and policies that influence social and economic development in rural settings in North America and low-income countries in the developing world. Courses provide background in the sociology of development in both the advanced and developing

countries. Students normally select a set of elective courses in which either domestic or international development is emphasized. These courses provide background in several aspects of development sociology, including: (1) an understanding of the processes of socioeconomic development in low-income or Third World countries and training in the formulation of strategies to enhance the socioeconomic well-being of citizens of those countries; (2) analysis of the social structures and processes for development in nonmetropolitan settings in the United States; (3) analysis of the processes of agricultural change and development in industrialized and low-income countries; and (4) an understanding of the processes of technological development and change in agriculture and other rural industries in developed and developing countries.

Students are encouraged to complement courses in the department with course work in the history and economics of development, area studies, and the policy sciences.

Courses in the population, environment, and society focus area provide an understanding of (1) the causes and consequences of the major components of population change—fertility, mortality, and migration; (2) the major patterns of population distribution and population characteristics in the United States and the developing world; (3) the relationships between social structure and the biophysical environment; (4) the relationships between population change and natural resource utilization in development; and (5) impacts of public policy interventions on population size, growth, and composition or on natural resource availability and environmental quality. Students normally select the elective courses for the major so as to stress either population studies or sociological aspects of natural resources and the environment.

Students are encouraged to complement courses in the department with course work in demographic methods, household analysis, ecology and evolution, environmental studies, natural resources, and policy sciences.

Courses in the social data and policy analysis focus area provide: knowledge of research methodology, statistics, and computer applications; an understanding of social, economic, political, and historical concepts essential for conducting meaningful analyses of practical problems and issues faced by organizations, communities, regions, and states; and knowledge and practice in policy analysis. Students ordinarily select electives in order to specialize in either policy analysis or in a particular area of public policy (international development policy, domestic rural development policy, environmental policy, or population policy, etc.).

Students are encouraged to complement courses in the department with course work in data collection and research design, evaluation research, computing, and advanced statistics.

Science of Earth Systems (SES)

During the past several decades, with the increasing concern about air and water pollution, nuclear waste disposal, the destruction of the ozone, and global climate change, the scientific community has gained considerable insight into how the biosphere, hydrosphere, atmosphere, and lithosphere systems interact. It has become evident that we cannot understand and solve environmental problems by studying these individual systems in isolation. The interconnectedness of these systems is a fundamental attribute of the Earth system, and understanding their various interactions is crucial for understanding our environment.

The SES major emphasizes the rigorous and objective study of the Earth system as one of the outstanding intellectual challenges in modern science and as the necessary foundation for the future management of our home planet. Cornell's strengths across a broad range of earth and environmental sciences have been fused to provide students with the tools to engage in what will be the primary challenge of the twenty-first century. The SES major has its home in the Department of Earth and Atmospheric Sciences, but relies on the collaboration of several departments across the university.

The SES curriculum includes a strong preparation in mathematics, physics, chemistry, and biology during the freshman and sophomore years. During the junior and senior years, students complete the SES core sequence, studying such topics as climate dynamics, Earth system evolution, and biogeochemistry. These classes emphasize the interconnectedness of the Earth system, and are team-taught by professors from different traditional disciplines. The selection of upper-level "concentration" courses allows the student to develop an area of expertise that complements the breadth of the introductory and SES core courses. Possible areas of concentration include climate dynamics, biogeochemistry, ecological systems, environmental geology, ocean sciences, environmental biophysics, hydrological system, and soil science.

The SES major provides a strong preparation for graduate school in any one of the Earth system sciences, such as atmospheric sciences, geology/geophysics, oceanography, hydrology, ecology, and biogeochemistry. Students seeking employment with the B.S. degree will have many options in a wide variety of environmentally oriented careers in both the private sector and government. Students with the strong science background provided by the SES major are also highly valued by graduate programs in environmental law, public affairs, economics, and public policy. In addition, the emphasis on basic science makes the SES major excellent preparation for medical school.

The requirements for the major are as follows:

1. Basic Math and Sciences

This part of the SES curriculum builds a strong and diverse knowledge of fundamental science and mathematics, providing the student with the basic tools needed in upper-level science classes.

a. MATH 191 or 193, and MATH 192 (or MATH 111, 112)

b. PHYSICS 207 and 208 (or PHYSICS 112, 213)

c. CHEM 207 and 208

d. BIOGD 101/103–102/104 (or 105–106) or BIOGD 109/110

e. Three additional 3–4 credit courses in basic science and math, generally 100 and 200-level classes. At least one of the following courses must be included in the selection:

GEOL 201 Physics and Chemistry of the Earth

BIOEE 261 Ecology and the Environment

Other examples are MATH 293 and MATH 294, biochemistry, organic chemistry, PHYS 214, and introductory statistics. With the exception of the introductory statistics course, the additional basic courses will require at least one of the classes listed above as a prerequisite.

2. Science of Earth Systems Core Courses

Three 4-credit courses that emphasize the interconnectedness of the Earth system are required. These classes are founded on the most modern views of the planet as an interactive and ever-changing system, and each class crosses the traditional boundaries of disciplinary science.

EAS 302 Evolution of the Earth System

EAS 331/ASTRO 331 Climate Dynamics

EAS 321/NATRES 321 Biogeochemistry

3. Concentration Courses

Four intermediate to advanced-level courses (300-level and up) that build on the core courses and have prerequisites in the basic sciences and mathematics courses. These classes build depth and provide the student with a specific expertise in some facet of Earth system science. The concentration should be chosen before the junior year in consultation with an SES adviser whose interests match those of the student.

For more information contact Professor Kerry H. Cook, Department of Earth and Atmospheric Science, khc6@cornell.edu, and visit the web site: www.geo.cornell.edu/ses/

Special Programs in Agriculture and Life Sciences

General Studies. The opportunity to develop an independent major in General Studies is available for students interested in pursuing a general education in Agriculture and Life Sciences. In consultation with a faculty adviser, students may plan a sequence of courses suited to their individual interests, abilities, and objectives in an area not encompassed by the existing programs. In addition to the distribution and other college requirements, this major may include a concentration of courses in one of several academic units of the college or university.

Students completing this major are often planning a career in agriculturally related food and service enterprises. Many of the fast-growing occupations require the broad perspective, the scientific and technical skills, the attitudes and the analytical ability that a general education fosters.

General Studies includes production agriculture as well as technical work in the agricultural and life sciences. Many biotechnology concerns deal with aspects of agriculture, especially plants, crops, and ecosystems in the natural environment. A strong grounding in biological sciences as well as knowledge of the agricultural sciences is essential in this rapidly growing field. Students should plan basic course work in the major areas of study in the college—animal sciences, plant sciences, environment and technology,

agronomic sciences, biological sciences, and social sciences. Advanced courses may be selected in these and other areas of individual interest or career aspiration. A course of study for a special program must be planned with and approved by a college faculty adviser. Information on the options and names of faculty advisers prepared to advise in special programs are available in the Counseling and Advising Office, 140 Roberts Hall.

International Agriculture provides students with an understanding of the special problems of applying basic knowledge to the processes of agricultural development in low-income countries. The student typically specializes in a particular subject and works with an adviser to plan a program oriented toward international agriculture. The courses in International Agriculture are designed to acquaint students with the socioeconomic factors in agricultural development, with the physical and biological nature of tropical crops and animals, and the various world areas for which study programs exist. Study of a foreign language is required.

In addition to the college distribution requirements, students in International Agriculture must take a minimum of 30 credits toward the major. A minimum of seven credits in International Agriculture and eight credits in a modern foreign language are required. Students are expected to complete an overseas field experience of a minimum of six weeks. The other courses recommended are drawn from a wide range of disciplines. The objective is to familiarize students with the many facets of agricultural development in low-income countries. Students are encouraged to take additional specialized courses in one of the other program areas of the college.

International Studies Certificate Program for CALS Undergraduates

Preparing for leadership in an increasingly interconnected and dynamic world, CALS undergraduates need knowledge, skills and attitudes that build "global competencies." The certificate program for CALS students *not* majoring in International Agriculture will recognize an international concentration of coursework and experiences.

Requirements

- Four courses with significant international content, as recommended by students' major departments (2 should be from CALS).
- One semester of the Global Seminar, INTAG 480.
- Four semesters of foreign language instruction, or demonstrated language competency equivalent to that achieved by the end of the 4th semester of instruction at Cornell.
- An approved overseas experience (exchange, study abroad program, internship or faculty-led short course).

For more information contact the Student Services Coordinator in the International Agriculture Program Office, 31 Warren Hall, (607) 255–3037.

DESCRIPTION OF COURSES

Undergraduate and graduate courses in the college are offered through the academic departments and units and also through the Biological Sciences undergraduate program and the Division of Nutritional Sciences.

Descriptions of undergraduate and graduate courses are arranged by department, in alphabetical order.

Graduate study is organized under graduate fields, which generally coincide with the departments. Graduate degree requirements are described in the Announcement of the Graduate School. Courses for graduate students are described in the section on the academic department that offers them.

INTERDEPARTMENTAL/ INTERCOLLEGE COURSES

American Indian Studies

American Indian Studies is the instructional component of the American Indian Program (AIP). It is a multidisciplinary program offering course work that enhances students' understanding of the unique heritage of North American Indians and their relationship to other peoples in the United States and Canada. Students are challenged by such topics as the sovereignty rights of Indian nations and the contemporary relevance of Indian attitudes toward the environment. The program's instructional core consists of courses that focus on American Indian life from pre-contact times to the present and feature the perspectives of Native American people.

The American Indian Program offers a concentration in American Indian Studies to undergraduate students in conjunction with their major defined elsewhere in the university. The concentration will be earned upon completion of five courses: American Indian Studies 100 and American Indian Studies 175, plus three other courses selected from the American Indian Studies course listing, for a total of at least 15 credits. Students choosing a concentration in American Indian Studies should obtain application materials from the AIP office in 450 Caldwell. AIP also offers a graduate minor.

Students interested in choosing the minor should contact Daniel Usner, American Indian Program, (607) 255–8402.

D. H. Usner, Director; B. Baker, S. Baugher, C. C. Geisler, A. Gonzales, B. Lambert, J. Mt Pleasant, R. W. Venables

AIS 100 Introduction to American Indian Studies (also R SOC 100)
Fall. 3 credits. W 7:30–10:30 P.M. plus sections. R. W. Venables.
Slide lectures survey the rich cultures and complex histories of the Indian nations north of Mexico. Indian arts and philosophies are compared and contrasted with those of Europe, Africa, Asia, Canada, and the United States. The origins of today's major legal issues involving American Indians are also discussed. The course begins with a survey of Indian America before Columbus and ends at Wounded Knee in 1890, the event which marks the end of the conquest of Indian America. Guest lecturers, including American Indian leaders, provide additional perspectives.

AIS 175 Indian America in the 20th Century (also R SOC 175)
Spring. 3 credits. M W 11:15–12:05 plus sections. B. Baker.
This course addresses major U.S. policies affecting American Indians in the 20th Century, and ways in which American Indians pursued strategies to sway the process of social change. American Indian political, economic, and cultural issues are examined through history, literature, art, and film. The approach of this course is interdisciplinary and an emphasis is placed on the study of American Indians as living cultures. Current trends are discussed, and the implications for American Indians in the 21st Century are explored. Guest lecturers, including American Indian scholars and leaders, provide additional perspectives.

[AIS 209 Political History of American Indians in the U.S. (also HIST 209)
4 credits. Seminar designed for underclassmen but open to all students. Enrollment limited to 15 students. Not offered 2001–2002. D. H. Usner.
An investigation of political organization and change among Native American societies. Discussions and assignments examine forms of tribal government, diplomacy, and warfare, as well as political relations with European colonies and the United States. Specific topics include pan-Indian confederacies, Indian policy, struggles over sovereignty, and Indian strategies of autonomy and resistance.]

AIS 230 Cultures of Native North America (also ANTHR 230)
Fall. 3 or 4 credits. M W F 1:25–2:15. B. Lambert.
A survey of the principal Inuit and American Indian culture areas north of Mexico. Selected cultures are examined to bring out distinctive features of the economy, social organization, religion, and worldview. Although the course concentrates on traditional cultures, some lectures and readings deal with changes in native ways of life that have occurred during the period of European-Indian contact.

[AIS 260 Introduction to American Indian Literatures (also ENGL 260 and AM ST 260)
4 credits. Not offered 2001–2002. Staff.
An introduction to Native American literatures, a variety of genres—novels, short fiction, autobiography, poetry, oral traditions—are covered spanning Indian publications through the last two centuries. Issues arising from the texts include aesthetics of orality and literacy; cultural change and survival; colonial identity politics; mythic histories; worldviews and ideologies; and contemporary tribal sovereignty. A goal of the course is to read historical American contexts through the eyes of Native American texts.]

[AIS 261 Urban Archaeology (also LA 261 and CRP 261)
4 credits. Not offered 2001–2002. S. Baugher.
Urban archaeologists study American Indian, colonial, and nineteenth-century sites which now lie within the boundaries of modern cities. This course explores how urban centers evolve; what lies beneath today's cities; and how various cultures have altered the urban landscape. Students participate in a local archaeological excavation.]

[AIS 276 American Indian History, 1500–1850 (also HIST 276 and AM ST 272)
4 credits. Not offered 2001–2002.
D. H. Usner.
A survey of North American Indian history from the sixteenth century to the mid-nineteenth century. Relations between Indian nations and with European colonies are explored. Different cultural groups and cross-cultural encounters are compared, with emphasis on resistance and adaptation to European colonialism. The formative years of U.S. Indian policy and the experiences of Indian people through the removal era also receive close attention.]

[AIS 277 American Indian History Since 1850 (also HIST 277)
4 credits. Not offered 2001–2002.
D. H. Usner.
A historical study of American Indians in the United States and Canada from the mid-nineteenth century to the present. The active and complex role played by Indian people in their responses to government policies and to socioeconomic changes are emphasized. Challenges faced and initiatives taken by Indians are traced from the early reservation years to the current era of self-determination. Cultural change and continuity within Indian communities is closely examined.]

AIS 318 Ethnohistory of the Northern Iroquois (also R SOC 318)
Spring. 3 credits. Enrollment limited to 20. T 1:25–4:25. R. W. Venables.
The development of Iroquois (Houdenosaunee) history and culture is traced to the present day.

AIS 329 Indians, Settlers, and Slaves in the Early South (also HIST 329)
Spring. 4 credits. M W 10:10–11:00 plus sections. D. H. Usner.
History of the American South from the sixteenth century to the early nineteenth century with an emphasis on intercultural relations. Topics include colonization of the region by Spain, England, France, and the United States. American Indian adaptation and resistance, the evolution of slavery, African American relations with Europeans and Indians, and the role of racial ideology and ethnic identity in the formation of the South as a distinct section of the United States.

[AIS 360 Preindustrial Cities and Towns of North America (also LA 360 and CRP 360)
3 credits. Not offered 2001–2002.
S. Baugher.
Considers how various American Indian civilizations as well as diverse European cultures have exerted their influences on the organization of town and city living. Each culture has altered the landscape in their own way as they created their own built environments.]

[AIS 361 Sociology of American Indians (also R SOC 360)
Spring. 3 credits. Prerequisite: R SOC 101/SOC 101 or approval of instructor. Enrollment limited to 20. Not offered 2001–2002. W 2:30–4:25. B. Baker.
This course is designed to emphasize the role of theory and research in our understanding of American Indians. Towards that end, the relationship between the nation-state and indigenous populations is emphasized. Students are exposed to the following theoretical perspectives: world systems and dependency, internal colonialism, social disintegration, the social construction of reality, political mobilization, and ethnic reorganization. The course is also historical and comparative, as students study different Indian tribes located in the United States and Canada.]

[AIS 363 American Indians, Planners, and Public Policy (also LA 363 and CRP 363)
3 credits. Not offered 2001–2002.
S. Baugher.
Decisions made by public agencies and private enterprise too often lead to the flooding, polluting, strip-mining, or other destruction of American Indian reservations, archaeological sites, and burial grounds. The central focus of the course is how to address urban and regional problems without imperiling the cultural survival of minorities.]

AIS 367 American Indian Politics and Policy (also R SOC 367)
Fall. 3 credits. Enrollment limited to 20. T R 2:55–4:10. B. Baker.
This course addresses the Constitutional basis of the Federal-Indian relationship through an examination of treaties, Supreme Court decisions, and Congressional law-policy. The effects of European and American forms of governance on traditional American Indian political structures are detailed and contrasted with contemporary tribal governments and political organizations. Issues relating to sovereignty and self-governance with respect to American Indian tribal governments are addressed relative to state and federal governments.

[AIS 429 Undergraduate Seminar in Indians of Eastern North America (also HIST 429)
4 credits. Not offered 2001–2002.
D. H. Usner.
A seminar examining the history of Native Americans in the eastern woodlands from colonial times to the present. The cultural and economic participation of Indians in the evolution of frontier societies is examined. Major topics include fur-trade networks, political relations, removal, and the persistence of Indian communities in eastern states.]

AIS 442 American Indian Philosophies: Selected Topics (also R SOC 442)
Spring. 3 credits. Prerequisite: permission of instructor. Enrollment limited to 15. R 1:25–4:25. R. W. Venables.
This course provides an opportunity for students to read and discuss a wide range of American Indian philosophies.

AIS 450 Practicum in American Indian Studies
Fall. 4 credits. Prerequisites: AIS 100 or 175; one additional AIS course at the 200 level or higher; and permission of instructor. F 2:30–4:25. B. Baker.
As a *service learning* initiative, this course provides students with the opportunity to work in American Indian reservations or urban communities. Students apply knowledge and skills derived from their AIS coursework and major field of study under the supervision of Cornell faculty affiliated with the American Indian Program and representatives from Indian communities. Students are expected to contribute to the goals and objectives identified by Indian communities during the semester. Students meet in a weekly seminar where they engage in critical dialogue and reflection about the experience relative to academic knowledge. Students also write a series of short papers and submit a final project at the end of the semester.

[AIS 600 American Indian Studies
4 credits. Not offered 2001–2002. Staff.
This seminar surveys the field of American Indian Studies across different academic disciplines. Designed specifically for students considering the graduate minor in American Indian Studies, it offers some common intellectual ground beyond the more specialized avenues of scholarship. Various areas of study are explored, with an emphasis on current methods, theories, and problems involved in researching Indian topics in Canada and the United States.]

[AIS 624 Graduate Seminar in American Indian History (also HIST 624)
4 credits. Not offered 2001–2002.
D. H. Usner.
This seminar examines, through a selected series of major topics and problems, the historical study of North American Indians. Emphasis is placed on current interpretations and directions.]

AIS 665 Topics in Native American Societies and Cultures (also ANTHR 665)
Spring. 4 credits. B. Lambert.

Department of Statistical Science

The university-wide Department of Statistical Science coordinates undergraduate and graduate study in statistics and probability. A list of suitable courses can be found in the "Interdisciplinary Centers, Studies, and Programs" section at the front of this catalog (see p. 24).

NONDEPARTMENTAL COURSES

ALS 101 Transition and Success to Cornell
Fall. 1 credit. Prerequisites: must be an entering student in CALS. Letter grade only. B. O. Earle and CALS Career Development Office.
Discussion-oriented course to enable all new CALS students to enjoy their experience at and transition to Cornell. Lecture, discussion, guest speakers, and assignments that explore Cornell's history, services, and organizations are used. Emphasis on role of Agriculture and Life Sciences in future of all related careers.

ALS 134 Emergency Medical Technician
Fall and spring. 3 credits. S-U grades optional. Prerequisite: none—but basic and advanced first aid recommended. Lec, M 1:30–5:00; lab, W 1:30–5:00.
D. A. Grossman, P. Rach and A. E. Gantert.
E.M.T. is an intensive 140-hour course taught throughout the fall and spring semesters. Enrollment, therefore, occurs in the fall term only. Course includes training in C.P.R. for the professional rescuer, oxygen administration, airway management, fracture management, bleeding control, patient assessment, spinal immobilization, medical antishock trousers, and defibrillation. Students will qualify for the New York State E.M.T. Certification Exam upon successful completion of the course. Classes are conducted in the Teagle Hall second-floor classroom.

ALS 400 Internship
Fall, spring, or summer. 6 credits maximum. Not open to students who have earned internship credits elsewhere or in previous terms. S-U grades only.
Students may register only for internships in the New York State Assembly Intern Program, the New York State Senate Session Assistant's Program, and the Albany Semester Program. A learning contract is negotiated between the student and the faculty supervisor(s), stating conditions of the work assignment, supervision, and reporting. Participation is required in any structured learning activities associated with the internship.

ALS 402 Agricultural Study Tour to Burgundy, France
Spring. 2 credits. Prerequisite: must be a registered CALS student. S-U grades optional. L. A. Weston and P. Durand.
A two-week study tour held in the month of May in Burgundy, France. Students experience French agriculture, history, and cuisine. Tour includes wine, fruit, vegetable, cheese dairy, beef and poultry production, and French university facilities featuring modern agricultural research. Ten- to twenty-page paper requirement. Students travel throughout Burgundy and Eastern France with Pascal Durand, professor at ENESAD in Dijon France.

ALS 403 Internship Opportunities in Burgundy, France
Spring. Variable to 4 credits. Prerequisites: enrollment in the Agricultural Study Tour of Burgundy, France. Some French language experience preferred. S-U grades optional. L. A. Weston and P. Durand.
Six- to eight-week internship experiences in Burgundy, France in agriculturally related subject areas including viticulture, agribusiness, agronomy, food science, and biotechnology. Final paper documenting internship experience required.

ALS 477 Environmental Stewardship in the Cornell Community
Fall and spring. 2–4 variable credits. T R 11:40–1:10. J. M. Regenstein plus a faculty adviser.
Each student undertakes an original project to improve the environment at Cornell while working with a faculty adviser and the Cornell infrastructure (generally campus life and/or facilities). Through seminar discussions and presenters on environmental activism, students learn how to be more effective at developing environmental programs in the future, both during and after college. The final written project report is also presented orally at a public forum. (Note: If students prefer to take one or two credits of independent research in a department in the College of Agriculture, this can be arranged. Assistance in finding a faculty adviser is provided. This course may be taken more than once.)

ALS 480 Global Seminar: Environment and Sustainable Food Systems (also EDUC 480 and INTAG 480)
Spring. 3 credits. Prerequisite: juniors, seniors, and graduate students. Letter grade. Lec, R 8:00–9:55 A.M.; lab, 3:35–4:25 P.M. scheduled, one additional hour unscheduled. H. D. Sutphin, P. A. Arneson, and D. Lee.
A distance learning course involving Cornell and universities in Australia, India, The Netherlands, Sweden, Costa Rica, and Honduras. The seminar provides students the opportunity to explore and learn about the dynamic linkages between sustainable development, food security, population, the environment, and socio-economic progress from a global perspective. Students across the different sites interact via Internet, satellite, and videoconferencing technologies to analyze a series of interdisciplinary case studies related to global sustainable development. Teams of international students collaborate on a number of projects that are presented during a live videoconference at the end of the semester.

ALS 500 Politics and Policy: Theory, Research, and Practice (also AM ST 501, PAM 406 and GOVT 500)
Students in the College of Agriculture and Life Sciences must register for ALS 500. S. Jackson and staff.
This course, taught in Washington, D.C., forms the core of the public policy option of the Cornell-in-Washington Program. The central course objective is to provide students with the instruction and guidance necessary to analyze and evaluate their own chosen issue in public policy. Toward that end, the course has three components: (1) weekly lectures providing background on the structures and processes of national politics and policy as well as training in research methodology; (2) student externships; and (3) individual research papers or projects. All three components interrelate to provide students with a strategy and framework for integrating classroom-based learning, field experience, and individual research. Applications are made through the Cornell-in-Washington office, 311 Caldwell Hall.

ALS 661 Environmental Policy (also Biology and Society 461 and BIOEE 661)
Fall and spring. 3 credits each term. (Students must register for 6 credits each term since an "R" grade is given at the end of the fall term.) Limited to 12 students. Prerequisite: permission of instructor. Sem R 2:30–4:30 P.M. D. Pimentel.
This course focuses on complex environmental issues. Ten to twelve students, representing several disciplines, investigate significant environmental problems. The research team spends two semesters preparing a scientific report for publication in *Science or BioScience*. Thus far, every study has been published.

AGRICULTURAL AND BIOLOGICAL ENGINEERING

M. F. Walter, chair; B. A. Ahner, L. D. Albright, D. J. Aneshansley, A. J. Baeumner, J. A. Bartsch, J. R. Cooke, A. K. Datta, K. G. Gebremedhin, D. A. Haith, J. B. Hunter, L. H. Irwin, W. J. Jewell, C. D. Montemagno, J.-Y. Parlange, N. R. Scott, T. S. Steenhuis, M. B. Timmons, L. P. Walker; T. J. Cook, L. D. Geohring, P. E. Hillman, lecturers

Note: Class meeting times are accurate at the time of publication. If changes occur, the department will provide new information as soon as possible.

ABEN 102 Introduction to Microcomputer Applications
Fall or spring. 3 credits. S-U grades optional. PC or Mac labs available. All students, including those pre-enrolled, must attend the first lecture to guarantee admittance and to select a laboratory section. Lec, fall: T R 12:20–1:10, spring: M W 12:20–1:10, labs, M 1:25–4:25 or 7:30–10:30 P.M. or T 1:25–4:25 or W 1:25–4:25 or 7:30–10:30 P.M., or R 1:25–4:25 P.M. Fee, $15. P. E. Hillman.
Introduction to application packages on microcomputers. Laboratories provide experience with word processing, spreadsheets, database management, presentation graphics, and web page authoring. An independent project related to the student's major is required. PC or Mac labs cover the same software material. These packages and others such as desktop publishing, multimedia, statistical software, and those used for searching the Internet for information are discussed and demonstrated in the lectures, along with computer hardware and operating systems.

ABEN 110 Introduction to Metal Fabrication Techniques
Spring. 3 credits. Each lab limited to 18 students. Lec, T R 9:05; labs M T or R 1:25–4:25, M or T 7:30–10:30. T. J. Cook.
Emphasis is on selection of proper materials and techniques to accomplish a variety of metal fabrication and maintenance projects. Covers hand and machine tools, fasteners, strengths of materials, classification and identification of metals, soldering, brazing, forging, pipe fitting, sheet metal work, controlling distortion, oxy-acetylene cutting, and arc welding.

ABEN 132 Introduction to Wood Construction
Fall. 3 credits. Each lab limited to 15 students. Lec, T R 9:05; labs, T W or R 1:25–4:25, T or W 7:30–10:30. T. J. Cook.
Principles and practice of wood construction. Covers site selection and preparation, drainage, water and septic development, footers and foundations, material properties, framing and roofing, comparison of alternatives to wood construction, use of hand and power tools, wood joining methods, fasteners, concrete work, and block construction. Each student plans and constructs an approved carpentry project.

ABEN 151 Introduction to Computing
Fall. 4 credits. Lecs, M W F 11:15–12:05; labs, W R 12:20–2:15, 2:30–4:25, F 1:25–2:30. Each lab and recitation section limited to 22 students. L. D. Albright.
An introduction to computer programming and concepts of problem analysis, algorithm development, and data structure in an engineering context. The structured programming language, JAVA, is used, implemented on interactive personal computers, and applied to problems of interest in agricultural and biological engineering. No previous programming experience is assumed.

ABEN 152 Computer Applications for Engineers
Spring. 1–3 credits variable (three 1-credit modules). A student can take any one, any two, or all three modules. Prerequisites: ABEN 151 or equivalent computer programming course and 1 semester of calculus for the Matlab module. No prerequisites for the other two modules. Letter grades only. Lec, T R 2:30–3:20 P.M.; lab M W 1:25–4:25 P.M., or W 7:30–10:30 P.M. P. E. Hillman.
Major application packages useful to engineering and science students are covered in three modules. The first module introduces Matlab and explores the problem-solving

capabilities of Matlab through examples. The second module investigates the data processing and graphing capabilities of spreadsheets. The third module uses presentation graphics and word processing to create effective visual and written documents for professional presentations.

Module 01 Matlab (weeks 1 to 5 of the spring semester)
Covers matrix/vector manipulation, basic math functions, graphing of 2-D and 3-D plots, file I/O, string and numerical manipulation, problem solving of linear and nonlinear algebraic functions and ordinary differential integration, curve fitting, and data analysis and statistics. In lab, students learn Matlab through examples. Grading is based on completion of lab assignments, lecture quizzes, and lecture attendance.

Module 02 Spreadsheets (weeks 6 to 10 of the spring semester)
Covers the use of Microsoft Excel to include built-in functions, lookup tables, graphs, Visual Basic macros, what-if analysis, and advantages and disadvantages compared to a programming language. Grading based on completion of lab assignments, lecture quizzes, and lecture attendance.

Module 03 Presentation tools for the Professional Engineer (weeks 11 to 14 of the spring semester)
Covers the use of Microsoft Word to create a written report and Microsoft PowerPoint to create slides for an oral presentation of engineering projects for professional presentations. Special attention is given to the execution of quality presentations. Grading based on lab assignments, lecture quizzes, lecture participation, and an oral PowerPoint presentation and written report submitted as the final exam.

ABEN 200 The ABEN Experience
Spring. 1 credit. Letter only. Prerequisite: nonmajors by permission of instructor. Lec, T 1:25–2:15. K. M. Overton, J. A. Bartsch.
A required course for freshman majors in Agricultural and Biological Engineering. A forum covering the career opportunities for engineering students and the activities and curricula that lead to these opportunities. A series of seminars are given by practicing engineers, Cornell faculty members, alumni, staff from Cornell career offices, and students. Students develop personalized written career plans, do a web search for jobs and internships, and select future courses to meet their career goals.

ABEN 250 Engineering Applications in Biological Systems (also Engineering Distribution 250)
Fall. 3 credits. Prerequisite: enrollment in an engineering curriculum, MATH 293 (coregistration permissible). Recommended for the sophomore year. Lec, M W F 12:20–1:10. B. A. Ahner.
Case studies of engineering problems in agricultural, biological, and environmental systems, including bioremediation, crop production, environmental controls, energy, biomedicine, and food engineering. Emphasis is on the application of mathematics, physics, and the engineering sciences to energy and mass balances in biological systems.

ABEN 299 Sustainable Development: A Web-Based Course
Spring. 3 credits. Prerequisite: sophomore standing and above. S-U grades optional. N. R. Scott.
Sustainable development is the dominant economic, environmental, and social issue of the twenty-first century. This web-based course develops the concepts of sustainable development as an evolutionary process, demanding the integration of the physical sciences and engineering with the biological and social sciences for design of systems. Topics include the nature of ecosystems, global processes, sustainable communities, and industrial ecology and life cycle analysis.

ABEN 301 Renewable Energy Systems
Spring. 3 credits. Prerequisite: college physics. Lec, T R 10:10–11:25. L. D. Albright.
Introduction to energy systems with emphasis on quantifying costs and designing renewable energy systems to convert environmental inputs into useful forms of energy. Course covers solar energy, small-scale hydropower, wind, bio-conversion processes, house energy balances, and the public policy implications of alternatives. Use of spread sheets is extensive.

ABEN 305 Principles of Navigation (also Nav S 301)
Fall. 4 credits. 4 classes each week (lecture-recitation-project work). Lecs, M W F 8:00–8:50; lab, R 8:00 or 9:05. J.-Y. Parlange.
An introduction to the fundamentals of marine navigation emphasizing piloting and celestial navigation procedures. The course covers coordinate systems, chart projections, navigational aids, instruments, compass observations, time, star identification, use of the nautical almanac, tides and currents. Electronic navigation systems are also *briefly* discussed. This course does not satisfy ABEN technical electives.

ABEN 310 Advanced Metal Fabrication Techniques
Spring. 1 credit (2-credit option available). Prerequisite: ABEN 110 or permission of instructor. Lab, F 1:25–4:30. T. J. Cook.
Principles and practices extending beyond the scope of ABEN 110. Includes out-of-position, high carbon steel and cast iron welding. Topics such as soldering and brazing of aluminum, hard surfacing, both tungsten (TIG) and metallic (MIG) inert gas welding, plasma-arc and oxy cutting of metals are covered. Planning, development, and fabrication of a metal construction project for the two-credit option.

ABEN 350 Biological and Environmental Transport Processes
Fall. 3 credits. Prerequisites: MATH 294 and fluid mechanics (co-registration permissible). Lecs, M W F 11:15–12:05; disc, W 2:30–3:20. 2 evening prelims. K. G. Gebremedhin.
Focus is on understanding the principles of heat and mass transfer in the context of biological and environmental systems. Physical understanding of transport processes and simple reaction rates with application examples from plant, animal and human biology, the environment (soil/water/air), and industrial processing of food and biomaterials are emphasized.

ABEN 365 Properties of Biological Materials
Spring. 3 credits. Prerequisites: ENGRD 202 (coregistration permissible). Lec, T R 12:20–1:10; lab W 2:30–4:25, R 2:30–4:25, or F 2:30–4:25. J. A. Bartsch.
Mechanics and structural properties of biological materials. Mechanical testing of animal, plant, and food products. Laboratory exercises in quasi-static and dynamic testing of materials and interpretation of test results. Experimental techniques for determining engineering properties of these materials. This course satisfies the ABEN laboratory exeprience requirement.

ABEN 371 Hydrology and the Environment
Spring. 3 credits. Prerequisite: one course in calculus. 2 lecs, 1 lab. Lecs, T R 9:05–9:55; lab, F 2:30–4:25. T. S. Steenhuis, B. Richards.
Introduction to hydrology: the hydrologic cycle and the role of water and chemicals in the natural environment. Includes precipitation, infiltration, evaportranspiration, ground water, surface runoff, river meandering, floods, and droughts. Case studies, short field trips, and laboratories foster an understanding of concepts and principles of hydrologic processes.

[ABEN 411 Biomass Processing: Modeling and Analysis
Spring. 3 credits. Prerequisites: ABEN 250; ABEN 350 (or any course in heat and mass transport); BIOBM 331, 332, or BIOMI 290. Lec, M W F 9:05–9:55. Not offered 2001–2002. Next offered spring 2003. L. P. Walker.
This course is designed to introduce students to how basic concepts from physical chemistry, enzyme and microbial kinetics, and transport phenomena are used to model biomass conversion and degradation processes. Examples of different agricultural and environmental processes are used to explore model development, solutions, and validation. Strong emphasis on the use of differential equations to model process dynamics.]

ABEN 425 Science and Technology of Environmental Management
Fall. 3 credits. Prerequisite: senior and graduate students only. Letter only. Lec, T R 2:55–4:10. W. J. Jewell.
Quantitative description of decline in environmental quality caused by human activities, and exploration of science and technology solutions to pollution and their limits. Tools used by engineers and scientists to understand the environment are used to focus on water quality problems (two-thirds), air quality (one-sixth), and land quality (one-sixth).

ABEN 427 Water Sampling and Measurement
Fall. 3 credits. Prerequisites: fluids or a hydrology course and MATH 191. Lec, T 9:05–9:55; lab, T 1:25–4:25. L. D. Geohring and T. S. Steenhuis.
Get your feet wet and your hands busy with this course on water sampling methods where science and engineering technologies are integrated to quantify, characterize, and analyze environmental engineering problems. This field-based laboratory course focuses on quantification of surface and subsurface flow and quality, and includes sampling techniques of soils, sediment, and biological waste products. Quality assurance and control protocols and interpretation of watershed loading of contaminants are addressed. This course satisfies the ABEN laboratory exeprience requirement.

ABEN 435 Principles of Aquaculture
Spring. 3 credits. Prerequisite: must be at least a junior. Lec, W 1:25–4:25. M. B. Timmons.
An in-depth treatment of the principles of aquaculture: fish biology, waste treatment, engineering design, fish health, nutrition, processing, and so on. This course is intended to build upon the undergraduate's previous course background and interests. Includes supervised "hands-on" laboratory experiences.

ABEN 436 Aquaculture Using Recirculating Water Reuse Technology
Spring. 1 credit. Prerequisite: ABEN 435 (co-registration permissible). Lab, R 2:25–4:25. M. B. Timmons.
The course focuses on actual fish culture using water reuse technology. Course begins **after** spring break. Requires daily care of animals and performing water chemistry management. Team report required. Intended to complement ABEN 435 as a "hands-on" learning experience.

ABEN 450 Bioinstrumentation
Spring. 4 credits. Prerequisites: MATH 294, ABEN 151, PHYS 213, or permission of instructor. Lec, M W 8:40–9:50; lab, M or W 2:30–4:25. D. Aneshansley.
Biological and biomedical applications are emphasized in this laboratory-based course. The electronic instrument from sensor to computer is considered. Static and dynamic characteristics of components and systems are determined theoretically and empirically. General analog and digital signal condition circuits are designed, constructed, and tested. This course satisfies the ABEN capstone design requirement.

ABEN 453 Computer-Aided Engineering: Applications to Biomedical and Food Processes (also M&AE 453)
Spring. 3 credits. Prerequisite: computer programming (ABEN 151 or CS 100) and heat and mass transfer (ABEN 350 or equivalent). Lecs, M W 11:15–12:05; computation disc/lab: F 11:15. A. K. Datta.
Introduction to simulation-based design as an alternative to prototype-based design. Analysis and optimization of complex real-life processes using an industry-standard physics-based computational software on a supercomputer or on high end personal computers. Biomedical processes and industrial food processing applications of heat and mass transfer are covered. Computational topics introduce the finite-element method, pre- and post-processing, and pitfalls of using computational software. Students choose their own term project, which is the major component of the course (no final exam). The course satisfies the College of Engineering upper-level computing application requirement. This course satisfies the ABEN capstone design requirement.

ABEN 454 Physiological Engineering
Fall. 3 credits. Corequisite: fluid mechanics. Lecs, T R 12:20–1:10; lab T R 1:25–4:25. D. J. Aneshansley.
Engineering analysis and design in the physiology of animals and humans. Covers the use of engineering principles to study how animals work in nature and to intervene in physiological functions. The two major engineering themes are: signal processing as related to neural conduction, sound processing, vision, and image processing; and systematics as applied to cardiovascular and respiratory systems, bioenergetics, and bird flight. Laboratories involve experiments, computing applications, field trips, and live animal demonstrations. This course satisfies the ABEN laboratory experience requirement.

ABEN 456 Biomechanics of Plants (also BIO PL 456)
Fall. 3 credits. Prerequisites: upper division undergraduate or graduate status, completion of introductory sequence in biology and one year of calculus, or permission of instructor. S-U or letter grade optional. Lec, T R 11:15–12:05; disc, W 2:30–3:20. J. R. Cooke and K. J. Niklas.
An engineering approach is taken to plant form and function following the text, *Plant Biomechanics*. Topics include: mechanical behavior of materials, effect of geometry on mechanical behavior, plant-water relations, plant cell walls, mechanical behavior of tissues, mechanical attributes of organs, the plant body, fluid mechanics and biomechanics, and plant evolution.

ABEN 458 Biotechnology: Principles and Application in Engineering
Fall. 4 credits. Prerequisites: ABEN 350 (co-registration allowed), biochemistry, microbiology, fluid mechanics, or permission of instructor. Lecs, T R 8:40–9:55; lab 1:25–4:25 and 7:30–10:30 (students must attend both lab sections). A. J. Baeumner.
This course provides students with an understanding of the scientific and engineering principles of biotechnology and their applications in agriculture, environmental and consumer protection, manufacturing, and processing. Topics include microbial synthesis, production and degradation, genetic engineering, immobilization, biosensor techniques, up- and down-stream processing, and fermentation techniques. This course satisfies both the ABEN laboratory experience and the ABEN capstone design requirement.

ABEN 471 Geohydrology (also CEE 431 and EAS 445)
Fall. 3 credits. Prerequisites: Mathematics 294 and Engr 202. 2 lecs, 1 disc, lecture, field trip. W. Brutsaert, L. M. Cathles, J.-Y. Parlange, T. S. Steenhuis.
Intermediate-level study of aquifer geology, groundwater flow, and related design factors. Includes description and properties of natural aquifers, groundwater hydraulics, soil water, and solute transport.

ABEN 473 Watershed Engineering
Fall. 3 credits. Prerequisite: fluid mechanics or hydrology. Lecs, T R 10:10–11:00; disc, R 1:25–4:30. M. F. Walter.
Engineering principles are applied to the design of soil and water management technologies aimed at solving natural resource problems in the context of watersheds. Emphasis is placed on rural and countryside engineering and small-scale design for water conveyance, soil erosion control, flood damage control, earthen dams, ponds, moisture conservation, drainage, and water supply. ABEN students who wish to take this course to satisfy the ABEN capstone design requirement, must co-register in ABEN 496 for one credit hour. This course satisfies the College of Engineering technical writing requirement when co-registered in ABEN 493.

ABEN 474 Drainage and Irrigation Design
Spring. 3 credits. Prerequisites: fluid mechanics or hydrology. Lecs, M W F 12:20–1:10. T. S. Steenhuis and L. D. Geohring.
This course will focus on design of drainage and irrigation systems for agriculture and nonagricultural purposes. The course will also briefly cover design for rural water supply and sanitation systems. Emphasis is placed on problem solving with actual situations used wherever possible. One major design project is required of each student. This course satisfies the ABEN capstone design requirement.

ABEN 475 Environmental Systems Analysis
Spring. 3 credits. Prerequisites: Matlab and 2 years of calculus. Lecs, M W F 10:10–11:00. L. P. Walker.
Systems analysis and its use in environmental quality management. Emphasis is on modeling of environmental problems, translation of models into efficient computational algorithms, and use of computer simulation and optimization procedures (search techniques, linear programming, and dynamic programming) to evaluate management alternatives. Applications include water quality management, air pollution control, solid waste management, and industrial ecology. This course satisfies the College of Engineering upper-level computing application requirement.

ABEN 476 Solid Waste Engineering
Spring. 3 credits. Prerequisites: 1 semester of physics and chemistry. Lecs, T R 11:40–12:55. D. A. Haith.
Planning and design of processes and facilities for management of municipal solid wastes. Source characterization and reduction; collection and transport systems; waste-to-energy combustion; sanitary landfills; composting; recycling and materials recovery facilities; and hazardous waste management. Emphasis is on quantitative analyses.

ABEN 478 Ecological Engineering
Spring. 3 credits. Prerequisite: junior-level environmental quality engineering course or equivalent. Lecs, T R 2:30–3:45. W. J. Jewell.
Natural waste treatment systems are sustainable, driven by solar power, and generate useful and valuable by-products. Constructed wetlands, hydroponic applications of plants, wastewater farming, sludge and industrial residue application to land, soil restoration, bioremediation of toxics, and biofilters for air purification are examples of pollution control systems that depend on natural processes. Pollution control mechanisms in soils and plants are defined and used to design innovative treatment systems for agriculture, municipalities, and industry. ABEN students who wish to take this course to satisfy the ABEN capstone design requirement must co-register in ABEN 496 for one credit hour.

ABEN 481 LRFD-Based Engineering of Wood Structures (also CEE 481)
Spring. 3 credits. Prerequisite: ENG 202. Lecs, M W F 12:20–1:10 (Hollister Hall). K. G. Gebremedhin. Two evening prelims.
Computer-aided and manual computation procedures of Load and Resistance Factor Design (LRFD)–based engineering of wood structures. Topics include national design codes and standards; estimation of design loads (dead, live, wind, snow, and seismic

loads); determination of factored resistance and stiffness values; mechanical properties of wood and wood products; designs of beams, columns, trusses, frames, arches, bridges, and diaphragms; connections and special wood structural members and systems. Engineering design judgment is also discussed as an integral component of the quantitative design procedure. ABEN students who wish to take the course to satisfy the ABEN capstone design requirement must co-register in ABEN 496 for one credit hour.

ABEN 482 Biothermal Engineering
Spring. 3 credits. Prerequisites: ABEN 250 and 350, or equivalent. Lecs, T R 11:15–12:05; lab, W 1:25–4:25. N. R. Scott.
Analysis and design of the thermal and aerial environments of plants, animals, and humans. Thermal environmental requirements dictate the design of buildings to act as buffers between biological systems and weather. Heat flow, air flow, psychrometrics, energy balances, thermal biology, animal and plant models, thermal modeling, mechanical and natural ventilation, solar energy, and weather phenomena. This course satisfies the capstone design experience requirement.

ABEN 489 Engineering Entrepreneurship, Management and Ethics
Spring. 3 credits. Prerequisites: ENGRD 270 or CEE 304 or equivalent, junior standing. Lec, T R 1:25–2:40; lab, one overnight field trip during semester. M. B. Timmons.
The course focuses on Engineering Economics, Engineering Management and Professional Ethics, and associated ethical issues. Course objectives include coverage of: prediction/probability of net returns; financial calculations (internal rate of return, time value of money, proforma statements); legal structures of businesses; project management; develop an awareness of issues related to professional ethics; and technical writing and communication. This course satisfies the College of Engineering technical writing reqiuirement.

ABEN 493 Technical Writing for Engineers
Fall. 1 credit. Prerequisites: co-registration with ABEN 473. Lec, M 7:30–9:25 (5 evenings in first half of semester). Staff.
This course meets the College of Engineering technical writing requirement when taken concurrently with ABEN 473. Class meets for five evening sessions during the fall semester and covers writing skills necessary for technical project reports. Also considered: outlines, style, audience, and general writing mechanics.

ABEN 494 Special Topics in Agricultural and Biological Engineering
Fall or spring. 4 credits maximum. S-U grades optional. Staff.
The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

ABEN 495 ABEN Honors Research
Fall or spring. 1–6 variable credits. Prerequisite: enrollment in the ABEN Honors Research program. Letter grade. Staff.
Intended for students pursuing the Research Honors program in ABEN. Students must complete the Honors program application by the 3rd week of the fall semester senior year.

ABEN 496 Capstone Design in Agricultural and Biological Engineering
Fall and spring. 1 credit. Corequisite: students must co-register in one of the approved upper level courses (ABEN 473, 478, 481). Students must register with an independent study form (available in 140 Roberts Hall). Staff.
Involves capstone design experience, including a team project incorporating analysis, design, evaluation, synthesis, and a written report of the end-product. This course must be taken in conjunction with one of the following approved ABEN courses (ABEN 473, 478, 481).

ABEN 497 Individual Study in Agricultural and Biological Engineering
Fall and spring. 1–4 credits. S-U option. Prerequisite: written permission of instructor and adequate ability and training for the work proposed. Normally reserved for seniors in the upper two-fifths of their class. Students must register with an independent study form (available in 140 Roberts Hall). Staff.
Special work in any area of agricultural and biological engineering on problems under investigation by the department or of special interest to the student, provided, in the latter case, that adequate facilities can be obtained.

ABEN 498 Undergraduate Teaching
Fall and spring. 1–4 credits. Prerequisite: written permission of instructor. Students must register with an independent study form (available in 140 Roberts Hall). Staff.
The student assists in teaching an agricultural and biological engineering course appropriate to his/her previous training. The student meets with a discussion or laboratory section, prepares course materials, grades assignments, and regularly discusses objectives and techniques with the faculty member in charge of the course.

ABEN 499 Undergraduate Research
Fall and spring. 1–3 credits. Prerequisites: normally reserved for seniors in the upper two-fifths of their class; adequate training for work proposed; and written permission of instructor. Students must register with an independent study form (available in 140 Roberts Hall). Staff.
Research in any area of agricultural or biological engineering on problems under investigation by the department or of special interest to the student, provided that adequate facilities can be obtained. The student must review pertinent literature, prepare a project outline, carry out an approved plan, and submit a formal final report.

ABEN 501–502 M.P.S. Project
Fall and spring. 1–6 credits. Required of each M.P.S. candidate in the field. Hours TBA. ABEN graduate faculty.
A comprehensive project emphasizing the application of agricultural technology to the solution of a real problem.

ABEN 551–552 Agricultural and Biological Engineering Design Project
Fall and spring. 3–6 credits. Prerequisite: admission to the M.Eng. (ABEN) degree program. ABEN graduate faculty.
Comprehensive design projects dealing with existing engineering problems in the field. Emphasis is on the formulation of alternative design proposals that include consideration of economics, nontechnical factors, engineering analysis, and complete design for the best design solution. Projects are supervised by faculty members on an individual basis. There, however, is a formal orientation during the first four weeks of the semester. A formal report and public presentation of the results of the design project are required for completion of the course(s). A minimum of 3 to a maximum of 12 credits of 551–552 is required for the Master of Engineering degree. Students should register for 551 their first semester and complete any additional design project credits with 552. If more than six design project credits are desired in one semester, both 551 and 552 may be taken.

ABEN 651 Bioremediation: Engineering Organisms to Clean Up the Environment
Spring. 3 credits. Prerequisites: BIOMI 290 or BIOMI 398 or BIOBM 331 or permission of instructor. Lec T R 10:10–11:00.
B. Ahner.
This course examines ways in which organisms may be used to remove or metabolize pollutants in the environment including bacterial degradation of organics and phytoremediation of heavy metals. Through lectures and current literature, students evaluate the benefits as well as the current obstacles. The current efforts to genetically engineer organisms for bioremediation and the potential risks of releasing them into the environment are examined.

ABEN 652 Instrumentation: Sensors and Transducers
Spring. 3 credits. Prerequisites: linear differential equations, introductory chemistry and introductory physics, or permission of the instructor. Lec T R 12:20–1:10; lab 2:00–4:25.
D. J. Aneshanley.
Application of instrumentation concepts and systems to the measurement of environmental, biological, and agricultural phenomena. Construction and characterization of electronic sensors and transducers is emphasized. Image processing techniques are introduced. A final project is required.

[ABEN 655 Thermodynamics and Its Applications
Spring. 3 credits. Prerequisite: Mathematics 293 or equivalent. Lecs, R 2:30–4:30. Not offered 2001–2002. J.-Y. Parlange.
Thermodynamics and its applications to problems in engineering and agriculture. Topics include basic concepts (equilibrium, entropy, processes, systems, potentials, stability, phase transitions) and applications (soil and water processes, dilute solutions, electromagnetism, surface phenomena, heat and mass transport, and structure of organizations).]

ABEN 658 Biosensors and Bioanalytical Techniques
Spring. 4 credits. Prerequisites: biochemistry and permission of instructor. Lecs, T R 8:40–9:55; lab, M 1:25–4:25.
A. J. Baeumner.
This course provides students with an understanding of the scientific and engineering principles of biosensors and bioanalytical techniques. The course addresses selected topics from simple biosensors to micro/nanofabricated microTotal Analysis Systems. Their application in environmental analysis,

food safety, and medical diagnostic is explored. Students take an active part in the course, prepare a biosensor of their choice in the laboratory, and present its concept in a biosensor workshop at the end of the semester.

[ABEN 671 Analysis of the Flow of Water and Chemicals in Soils
Fall. 3 credits. Prerequisites: four calculus courses and fluid mechanics. Lec, R 3:35–4:50 (first meeting—TBA after that). Not offered 2001–2002. J.-Y. Parlange.
The course encompasses a full range from simple to complex methods to describe the chemical and water flows on the surface, in the vadose zone, and through the aquifer. Current analytical, semi-analytical, and computer-based techniques are discussed. Both homogeneous and heterogeneous soils are analyzed. Offered alternately with Civil and Environmental Engineering 633—a complementary, but not identical, course.]

ABEN 672 Drainage
Spring. 4 credits. Prerequisites: ABEN 471 or ABEN 473. S-U grades optional. Lecs, M W F 12:20–1:10; lab, T 1:25–4:25. T. S. Steenhuis and L. D. Geohring.
Theory of water and solute flow in aquifers, hillslopes, and the vadose zone as it relates to artificial drainage is discussed. Drainage design as it relates to agricultural land, landfills, and land application sites is critically reviewed. The importance of preferential flow and matrix flow on water quality of drainage waters is examined. Laboratories are used for hands-on experience with measuring soil parameters and for actual drainage design. This course satisfies the capstone design experience requirement.

ABEN 673 Sustainable Development Seminar (also NBA 573)
Spring. 1–3 credits. Prerequisites: upper division undergraduate and graduate students or permission of instructor. Lec, F 1:30–3:30. N. R. Scott.
Sustainable development is the most beneficial concept to come out of the environmental movement in years. The concept of a sustainable world, however, is not a constant. There are many aspects of sustainability involving economics, environment, and political, social, scientific, and technological developments. This seminar explores topics such as energy, agricultural and food systems, green buildings and ecological design, corporate sustainability, and other contemporary issues.

ABEN 678 Nonpoint Source Models
Spring. 3 credits. Prerequisites: computer programming and calculus. Lecs, T R 8:40–9:55. D. A. Haith.
Development and programming of simulation models for management of water pollution from runoff and percolation. Emphasis is on prediction of water and chemical inputs to surface waters and groundwater. Applications include watershed hydrology and sediment yield, urban and rural runoff, lake eutrophication, waste disposal sites, and pesticides, nutrients, and salts in drainage.

ABEN 685 Biological Engineering Analysis
Spring. 4 credits. Prerequisite: T&AM 310 or permission of instructor. Lecs, M W F 11:15–12:05. J. R. Cooke.
Engineering problem-solving strategies and techniques are explored. Students solve several representative engineering problems that inherently involve biological properties. Emphasis is on formulation and solution of mathematical models and the interpretation of results. The student's knowledge of fundamental principles is used extensively.

ABEN 694 Graduate Special Topics in Agricultural and Biological Engineering
Fall or spring. 4 credits maximum. S-U grades optional. ABEN graduate faculty.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

ABEN 697 Graduate Individual Study in Agricultural and Biological Engineering
Fall or spring. 1–6 credits. Prerequisite: permission of instructor. S-U grades optional. ABEN graduate faculty.
Topics are arranged by the staff at the beginning of the term.

ABEN 700 General Seminar
Fall. 1 credit. S-U grades only. Staff.
Presentation and discussion of research and special developments in agricultural and biological engineering and related fields.

ABEN 750 Orientation to Graduate Study
Fall. 1 credit. Limited to new graduate students. S-U grades only. Lecs, first 7 weeks, M 3:35–4:25; remainder to be arranged. D. J. Aneshansley.
An introduction to ABEN research policy, programs, methodology, resources, and degree candidates' responsibilities and opportunities.

ABEN 754 Watershed Management
Spring. 2–3 credits. Prerequisite: graduate standing or permission of instructors. Lec, W 2:30–4:25. T. S. Steenhuis and M. J. Pfeffer.
Traditional top-down approaches to watershed management have been challenged by advocates of public participation. These challenges have raised questions about how to effectively integrate science, policy, and public participation. This course reviews different management approaches and evaluates their usefulness in dealing with different watershed management problems. Case examples from watersheds in the United States and overseas are considered.

ABEN 771 Soil and Water Engineering Seminar
Fall and spring. 1–3 credits. Prerequisite: graduate status or permission of instructor. S-U grades optional. Hours TBA. T. S. Steenhuis, J.-Y. Parlange, and M. F. Walter.
Study and discussion of research or design procedures related to selected topics in irrigation, drainage, erosion control, hydrology, and water quality.

ABEN 781 Structures and Related Topics Seminar
Spring. 1 credit. Prerequisite: graduate status or permission of instructor. S-U grades only. TBA. Staff.
Advanced analysis and design of production systems with emphasis on structural and environmental requirements, biological responses, and economic considerations.

ABEN 785 Biological Engineering Seminar
Spring. 1 credit. Prerequisite: graduate status or permission of instructor. S-U grades only. J. R. Cooke.
The interactions of engineering and biology, especially the environmental aspects of plant, animal, and human physiology, are examined in order to improve communication between engineers and biologists.

ABEN 800 Master's-Level Thesis Research
Fall and spring. 1–15 credits. Prerequisite: permission of adviser. S-U grades. ABEN graduate faculty.

ABEN 900 Doctoral-Level Thesis Research
Fall and spring. 1–15 credits. Prerequisite: permission of adviser. S-U grades. ABEN graduate faculty. Variable credit for Ph.D. research.

APPLIED ECONOMICS AND MANAGEMENT

A. M. Novakovic, chair; D. J. Allee, B. L. Anderson, C. B. Barrett, N. L. Bills, R. N. Boisvert, L. D. Chapman, N. H. Chau, R. D. Christy, J. M. Conrad, R. T. Curtis, H. de Gorter, G. A. German, B. A. Gloy, D. A. Grossman, J. M. Hagen, H. M. Kaiser, S. M. Kanbur, W. A. Knoblauch, S. C. Kyle, E. L. LaDue, D. R. Lee, W. H. Lesser, E. W. McLaughlin, M. G. Meloy, R. A. Milligan, T. D. Mount, T. Ng, P. D. Perez, D. J. Perosio, G. L. Poe, J. E. Pratt, C. K. Ranney, W. D. Schulze, D. Simon, M. W. Stephenson, D. H. Streeter, L. W. Tauer, W. G. Tomek, C. L. van Es, S. Wang, G. B. White

Courses by Subject

Farm management, agricultural finance, and production economics: 302, 403, 404, 405, 605, 608, 708

Statistics, quantitative methods, and analytical economics: 210, 410, 411, 412, 415, 416, 417, 710, 711, 712, 713, 714, 717

Management, finance, law, and accounting: 220, 221, 320, 321, 323, 324, 325, 326, 328, 329, 420, 422, 424, 425, 426, 427, 429

Policy and International Trade: 230, 430, 431, 432, 433, 434, 630, 632, 633, 634, 730, 735

Marketing and food distribution: 240, 241, 340, 344, 346, 347, 443, 446, 447, 448, 449, 640, 641, 740

Environmental and resource economics: 250, 450, 451, 555, 651, 652, 655, 750, 751

Economics of development: 464, 660, 665, 666, 667, 762, 763

Consumer economics: 670

General, contemporary issues, research, and other: 101, 380, 494, 497, 498, 499, 694, 698, 699, 700, 800, 900, 901

SPECIAL NOTE: The department formally known as Agricultural, Resource, and Managerial Economics (ARME) is changing its name to the department of Applied Economics and Management (AEM). Courses cross-listed as ARME can be found here. Courses with the same number listed as either ARME or AEM, are identical.

Note: Class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

AEM (ARME) 101 Introduction to Applied Economics and Management
Fall. 1 credit. Required of and limited to freshmen in Applied Economics and Management. S-U grades only. Lec, W 11:15–12:05. M. J. Hubbert.
An introduction to the various specialized programs of study within the Department of Applied Economics and Management. Numerous faculty members from the AEM Department will participate. Team work and group interaction are emphasized.

AEM (ARME) 210 Introductory Statistics
Fall. 4 credits. Prerequisite: EDUC 115 or equivalent level of algebra. Lecs, M W F 11:15–12:05; secs, M 7:30–9:25 P.M.; T 10:10–12:05, 12:20–2:15 (2 secs), or 2:30–4:25 (2 secs); W 12:20–2:15 (2 secs), 2:30–4:25, or 7:30–9:25 P.M.; R 12:20–2:15 (2 secs), 2:30–4:25 (2 secs), or F 12:20–2:15 (2 secs). 2 evening prelims. C. van Es.
An introduction to statistical methods. Topics covered include the descriptive analysis of data, probability concepts and distributions, estimation and hypothesis testing, regression, and correlation analysis. Applications from business, economics, and the biological sciences are used to illustrate the methods covered in the course.

AEM (ARME) 220 Introduction to Business Management
Spring. 3 credits. Enrollment limited to AEM majors and those in the process of transferring to the major. Preference given to other CALS majors. Additional enrollment as capacity permits, with permission of the instructor. 2 evening prelims. Lecs, M W F 10:10–11:00. P. D. Perez.
This course provides an overview of management and business. Human resources, marketing, finance, and strategy concerns are addressed with consideration paid to current issues such as globalization, ethics, quality, and strategic alliances. Case studies and guest executives are an important part of the course.

AEM (ARME) 221 Financial Accounting
Spring. 3 credits. Not open to freshmen. Priority given to CALS majors. Lecs, M F 11:15–12:05 or 12:20–1:10; sec, T 10:10–12:05 (2 secs), 12:20–2:15 (2 secs), or 2:30–4:25; W 10:10–12:05, 12:20–2:15 (3 secs), 2:30–4:25 (2 secs), or 7:30–9:25 P.M.; or R 10:10–12:05, 12:20–2:15, or 2:30–4:25. 2 evening prelims and a comprehensive final; weekly homework assignments; one written case study; and one project using an electronic spreadsheet. Staff.
A comprehensive introduction to financial accounting concepts and techniques, intended to provide a basic understanding of the accounting cycle, elements of financial statements, underlying theory of GAAP, and statements interpretation. Elements examined include inventory, depreciation, internal control of assets, time value of money, notes, stocks, bonds, and the statement of cash flows. Limited use of a financial data base of publicly held companies; introduction to financial information on the web.

AEM (ARME) 230 International Trade and Finance (also ECON 230)
Spring. 3 credits. Prerequisites: ECON 101 or equivalent required; ECON 102 or equivalent recommended. Lecs, T R 1:25–2:40; sec, M 2:30–3:20, 3:35–4:25, or 7:30–8:20 P.M.; T 3:35–4:25; or W 2:30–3:20, 3:35–4:25, or 7:30–8:20 P.M. 1 evening prelim. D. R. Lee.
This course provides a one-semester introduction to international economics principles and issues. The course first surveys key topics such as the elements of comparative advantage, tariff and non-tariff barriers, and multilateral institutions. The second part of the course treats selected topics in international finance, including exchange rates, balance of payments, and capital markets. Current issues such as the effects of trade liberalization, trade and economic growth, and instability in international capital markets are discussed throughout. This course is designed as a less technical introduction to concepts developed at a more advanced level in AEM (ARME) 430 and ECON 361–362.

AEM (ARME) 240 Marketing
Fall. 3 credits. Enrollment limited to AEM majors and those in the process of transferring to the major. Preference given to other CALS majors. Additional enrollment as capacity permits, with permission of the instructor. No adds after first week of class. Lecs, M W F 10:10–11. M. G. Meloy.
This course provides a broad introduction to the fundamentals of marketing. The components of an organization's strategic marketing program, including how to price, promote, and distribute goods and services to people are explored. Industry guest lectures and current marketing applications from various companies are presented and analyzed. Concurrent enrollment in AEM 241 is required for AEM majors and recommended for those considering transferring to AEM.

AEM (ARME) 241 Marketing Plan Development
Fall. 1 credit. Prerequisites: concurrent enrollment in AEM 240. Rquired of and limited to AEM majors enrolled in AEM 240; others by permission of instructor. Lecs, W 7:30–8:20 P.M. L. A. Robinson.
The course offers students, working in teams, the opportunity for an intense, hands-on application of basic marketing concepts through research and development of a marketing plan. Guided by a series of assignments, teams develop key components that are integrated into a comprehensive written plan for a local not-for-profit organization. A PowerPoint-based oral presentation of the plan is also required. All AEM majors registered in AEM 240 are required to take AEM 241. Additional students are accommodated on a space available basis with permission of the instructor. Assignments are closely coordinated with both the content and sequencing of material being presented in AEM 240.

AEM (ARME) 250 Environmental and Resource Economics
Spring. 3 credits. T R 11:40–12:55. S-U grades optional. G. L. Poe.
An introduction to the economic ocncepts and methods usedin the private and public analysis of how society uses and impacts its environmental resources. Subjects include valuation, benefit-cost analysis, policy design, property rights, and ecological economics. These tools are used to explore major current policy issues such as economic incentives in environmental policy, endangered species protection, air and water pollution, depletion of renewable and non-renewable resources, global warming, the growing world trade in resource intensive manufactured products and the impact on income, employment, pollution, and comparative resource use and environmental protection in industrialized and developing countries.

AEM (ARME) 302 Farm Business Management
Fall. 4 credits. Not open to freshmen. This course is a prerequisite for AEM 405 and 427. Lecs, M W F 9:05–9:55; sec, W or R 1:25–4:25. On days farms are visited, the section period is 1:25–6:00. W. A. Knoblauch.
An intensive study of planning, directing, organizing, and controlling a farm business, with emphasis on the tools of managerial analysis and decision making. Topics include financial statements, business analysis, budgeting, and acquisition, organization, and management of capital, labor, land, buildings, and machinery.

AEM (ARME) 320 Business Law I (also NBA 560)
Fall. 3 credits. Limited to juniors, seniors, and graduate students. Lecs, M W F 9:05–9:55. 1 evening prelim. D. A. Grossman.
Consideration is given chiefly to legal problems of particular interest to persons who expect to engage in business. Emphasis is on the law pertaining to contracts, sales, agency, and property.

AEM (ARME) 321 Business Law II (also NBA 561)
Spring. 3 credits. Limited to juniors, seniors, and graduate students. Prerequisite: a course in business law or permission of instructor. Lecs, T R 8:40–9:55. D. A. Grossman.
The first portion of this course examines legal issues in the formation and operation of business enterprises, particularly partnerships, corporations, and limited liability companies. The second portion of the course reviews selected topics in business law, like employment discrimination, debtor/creditor relations, product liability, unfair competition, e-commerce law, and international business law.

AEM (ARME) 323 Managerial Accounting
Fall. 3 credits. Priority given to CALS majors. Prerequisite: AEM (ARME) 221 or equivalent. Lecs, M W 12:20–1:10; secs, R 10:10–12:05 (2 secs), 12:20–2:15 (3 secs), or 2:30–4:25 (3 secs); or F 10:10–12:05 or 12:20–2:15 (3 secs). 2 evening prelims, a third exam, weekly homework, one written case study, and one project using an electronic spreadsheet. Staff.
An introduction to cost accounting that emphasizes the application of accounting concepts to managerial control and decision making. Major topics include product costing, standard costing, cost behavior, cost allocation, budgeting, inventory control, variance analysis, measuring divisional performance, and accounting systems in the manufacturing environment. Use of electronic spreadsheets is required.

AEM (ARME) 324 Financial Management
Spring. 4 credits. Priority given to CALS majors. Prerequisite: AEM (ARME) 220 or equivalent. Recommended: AEM (ARME) 210 and 221 or equivalents. Lecs, T R 2:55–4:10; secs, W 12:20–2:15, 2:30–4:25 or 7:30–9:25 P.M. or F 10:10–12:05, 12:20–2:15, or 2:30–4:25. 3 evening prelims. R. Curtis.

This course focuses on basic managerial, financial, and economic decisions, corporate financial policy, risk management, and investments. Topics include the time value of money, capital budgeting decisions, financing alternatives, short-term financial policy, the cost of capital and the capital structure decision, distribution policy, mergers and acquisitions, options, forward and futures contracts, market efficiency and market anomalies, and personal financial considerations.

AEM (ARME) 325 Personal Enterprise and Small Business Management
Spring. 4 credits. Limited to juniors and seniors. Prerequisites: AEM (ARME) 220 and 221 or permission of instructor. Absolutely no adds or drops after second class meeting. Term project work will amount to approximately $100 per team. Lecs, T R 12:20–1:10; sec, W 2:30–4:25. Two additional hours to be arranged. D. Streeter.
Course is focused on the activities involved in planning a start-up business, including the exploration of strategic dimensions, performance of marketing research, and planning of financial aspects related to the new company. Lectures and hands-on clinics include visits by real world entrepreneurs who discuss the start-up process and the challenges of managing growth in a small business. Term project is the development of a business plan, completed in teams of no fewer than three students.

AEM (ARME) 326 Human Resource Management in Small Businesses
Fall. 3 credits. Prerequisite: AEM (ARME) 220 or AEM (ARME) 302 or equivalent. S-U grades optional. Lecs, T R 10:10–11:25 or 11:40–12:55 or 2:55–4:10. 1 evening prelim. R. A. Milligan.
An introduction to the management of human resources in small businesses. The focus is on developing and using all of the capabilities of all small business personnel including owners, family members, and employees. Topics include people-oriented management, alignment, coaching, evaluation, recruitment, selection, compensation, training, empowerment, team building, leadership, performance management, and conflict resolution. Student involvement and active learning experiences are emphasized.

AEM (ARME) 328 Innovation and Dynamic Management (also H ADM 418)
Spring. 3 credits. Limited to juniors and seniors. Lecs, T R 1:25–2:40. C. Enz.
For description, see H ADM 418.

AEM (ARME) 329 Global Agribusiness Management
Spring. 1 credit. Prerequisites: AEM (ARME) 220 or AEM (ARME) 302, and AEM (ARME) 240. There is a 2-credit study trip that is available to 10–15 students (instructor permission necessary). Students complete an independent study for the 2 credits the following fall term. Cost of the study trip is $800 per student (some scholarship support is available). Lecs, W 10:10–11:00. B. A. Gloy and B. L. Anderson.
The general purpose of this course is to provide students interested in agribusiness management exposure to the managerial practices essential to the success of agriculture, agribusiness, and food companies competing in the global marketplace. Students are exposed to foreign and international U.S. firms and industries. A term paper is required. During the fifth week of the course 10–15 students are selected to participate in a two-credit, two-and-a-half week international study trip that occurs after the end of the semester. Preference is given to sophomores and juniors in the College of Agriculture and Life Sciences. An additional term paper will be required for the international field study. Preference is given to students with a demonstrated career interest in agribusiness. Students selected for the study trip enroll in a 2-credit independent study course (AEM 497) in the following fall semester.

AEM (ARME) 340 Futures and Options Trading
Spring. 3 credits. Limited to juniors and seniors. Priority given to CALS juniors and seniors, then out of college seniors. Prerequisites: ECON 101, EDUC 115, and AEM (ARME) 210 or equivalent. S-U grades optional. Lecs, T R 10:10–11:25. W. H. Lesser.
The focus of the course is on the use of futures and options as risk management tools. Commodities, exchange rate, and interest rate derivatives are covered from the perspective of the hedger, but those interested in arbitrage and speculation are provided some insights as well. Students participate in a simulated trading exercise in which they use price and market information and input from industry experts to manage a hedge position.

AEM (ARME) 344 Consumer Behavior
Fall. 3 credits. Prerequisites: AEM (ARME) 210 and AEM (ARME) 240 or equivalents. Limited to 45 juniors and seniors. Priority given to CALS students. Lecs, M W 2:55–4:10. M. G. Meloy.
This course introduces students to the psychological, sociological, and cultural theories of buyer behavior, with specific attention to consumer information processing and decision making. Class discussions, lectures, experiential exercises, and group projects are used to illustrate behavioral concepts and their application to marketing practice. The role of research in understanding and explaining consumer behavior is emphasized.

AEM (ARME) 346 Dairy Markets and Policy
Spring, weeks 1–7. 1 credit. Limited to juniors and seniors. Prerequisites: ECON 101 or equivalent. S-U grades optional. Lecs, R 2:30–4:25. M. Stephenson.
An introduction to dairy markets and policy. Major topics include: milk pricing, marketing channels, dairy trends and demographics, world trade for dairy products, and policy issues. Class participation is expected as topics and new ideas are explored.

AEM (ARME) 347 Strategic Marketing for Horticultural Firms
Spring. 1 credit. Prerequisite: AEM (ARME) 240. Lec, M 12:20–1:10. G. B. White.
This course emphasizes applications in strategic marketing. Lectures focus on practical aspects of the planning, implementation, and control phases of the strategic marketing process. Students develop a long-range marketing plan for a fruit, vegetable, greenhouse, nursery, winery, or related horticultural firm.

AEM (ARME) 380 Independent Honors Research in Social Science
Fall or spring. 1–6 credits. Limited to students who have met the requirements for the honors program. See "Honors Program" in CALS section of this catalog. Provides qualified students an opportunity to conduct original research under supervision. Information available in AEM (ARME) Undergrad Program Office in Warren Hall.

AEM (ARME) 403 Farm Management Study Trip
Spring. 1 credit. Prerequisite: AEM (ARME) 302. Open by application only. Secs, arranged. W. A. Knoblauch.
This is a special program to study production and management systems in diverse agricultural regions of the United States. Includes a trip (usually taken during spring break) to the region being studied. A different region is visited each year. The course meets in advance of the study trip and upon return from trip. A paper, selected by the student, which further explores an aspect of the trip, is a requirement for completing the course.

AEM (ARME) 404 Advanced Agricultural Finance Seminar
Spring. 2 credits. Limited to 16 seniors with extensive course work in farm management and farm finance. Open by application prior to March 1 of the year before the course is offered. W 2:30–4:25. E. L. LaDue.
A special program in agricultural finance, conducted with financial support from the Farm Credit System. Includes two days at Northeast Farm Credit offices, one week in Farm Credit Association offices, a one-day program on FSA financing during fall term, a two- to four-day trip to financial institutions in New York City, and an actual farm consulting and credit analysis experience in the spring term.

AEM (ARME) 405 Agricultural Finance
Spring. 4 credits. Prerequisite: AEM (ARME) 302 or equivalent. Lecs, M W F 9:05–9:55; sec, T 2:30–4:25. E. L. LaDue.
The principles and practices used in financing agricultural businesses, from the perspectives of the business owner and the lender. Topics include sources of capital, financing entry into agriculture, financial analysis of a business, capital management, financial statements, credit instruments, loan analysis, financial risk, and leasing.

[AEM (ARME) 410 Business Statistics
Spring. 3 credits. Prerequisite: preference given to AEM (ARME) majors. AEM (ARME) 210 or equivalent. Lecs, M W F 10:10–11:00. 2 evening prelims. Not offered spring 2002. C. van Es.
This course focuses on four major topics used to analyze data from marketing research, business, and economics. Topics studied are: survey sampling procedures, contingency table analysis, time series and forecasting, and experimental design and ANOVA. A brief introduction to nonparametric methods is also included. The course involves a research project designed to give experience in collecting and interpreting data.]

AEM (ARME) 411 Introduction to Econometrics
Spring. 3 credits. Prerequisite: AEM(ARME) 210 and either ECON 313 or PAM 200, or equivalents. Lecs, T R 2:55–4:10; sec M 7:30–9:25 P.M. D. Ng.

The course introduces students to basic econometric principles and the use of statistical procedures in empirical studies of economic models. Assumptions, properties, and problems encountered in the use of multiple regression are discussed and simultaneous equation models, simulation, and forecasting techniques are introduced.

AEM (ARME) 412 Introduction to Mathematical Programming

Fall. 3 credits. Primarily for juniors, seniors, and M.S. degree candidates. Prerequisite: AEM (ARME) 210 or equivalent. Lecs, T R 11:40–12:55; sec, T or W 1:25–2:15. J. E. Pratt.

This is a course in applied mathematical programming. Emphasis is on formulation of and interpretation of solutions to mathematical models of problems in economics and business. Blending, resource allocation, capital budgeting, transportation and financial planning, and inventory management are studied. Integer and nonlinear programming are introduced.

AEM (ARME) 415 Price Analysis (also ECON 415)

Fall. 3 credits. Prerequisites: AEM (ARME) 210 or equivalent. ECON 313 or PAM 200 or equivalent. Lecs, T R 8:40–9:55. H. M. Kaiser.

The focus of this course is on the analysis of supply and demand characteristics of commodities with particular attention to agricultural products. Special attention is paid to empirical analysis. Institutional aspects of pricing, temporal and spatial price relationships, price forecasting, and the economic consequences of pricing decisions are included.

AEM (ARME) 416 Demographic Analysis in Business and Government (also R SOC 331)

Fall. 3 credits. Prerequisite: AEM (ARME) 210 or equivalent. Lecs, M W F 1:25–2:15. W. Brown.

For description, see R SOC 331.

[AEM (ARME) 417 Decision Models for Small and Large Businesses

Spring. 3 credits. Limited to juniors and seniors. Preference given to AEM (ARME) majors. Prerequisites: AEM (ARME) 210 or equivalent. Lecs, M W F 1:25–2:15; lab W 7:30–9:25 or R 12:20–2:15 or R 2:30–4:25. In weeks labs are held, there will be no Friday lecture. Not offered spring 2002. C. L. van Es.

The course is focused on economic and statistical models of decision analysis and their application in large and small business settings. The course demonstrates how use of models can improve the decision-making process by helping the decision maker: understand the structure of the decision, incorporate subjective probabilities as a way to portray risk, measure outcomes in a way that is consistent with attitudes toward risk, and understand the value of information. The importance of sensitivity analysis is emphasized, as is the need to combine both quantitative and qualitative considerations in decision making. Cases are drawn from small business scenarios, the public policy arena, and corporate settings. Implementing decision models with computers is the focus of lab sessions.]

AEM (ARME) 420 Investments

Fall. 3 credits. Prerequisites: AEM (ARME) 210 or equivalent and AEM (ARME) 324. Recommended: ECON 313 and a calculus course. Preference given to students in AEM (ARME). Lecs, T R 1:25–2:40, sec F 9:05–9:55 or 10:10–11. S. Wang.

This course focuses on the theories and empirical data in the field of investments. Descriptions of financial institutions, markets, and instruments are also covered. Topics include: equilibrium models of security prices (CAPM, APT), fixed-income markets, derivatives, efficient market hypotheses, mutual funds, IPO, behavioral finance.

AEM (ARME) 422 Estate Planning (also NBA 562)

Fall. 1 credit. Limited to juniors, seniors, and graduate students. S-U grades only. Lecs, M 3:35–4:25. D. A. Grossman.

Fourteen sessions on the various aspects of estate-planning techniques. The law and use of trusts, the law of wills, federal and New York State estate and gift taxes, and substitutes for probate procedures are covered.

AEM (ARME) 424 Strategic Management

Fall and spring. 3 credits. Limited to AEM (ARME) seniors in Business. Fall, T R 10:10–11:25. Spring, T R 8:40–9:55 or 10:10–11:25. D. Simon.

This is a capstone course designed to integrate what students have learned in other AEM (ARME) courses with an emphasis on strategic decision making. Issues are approached from the standpoint of the board of directors, chief executive officer, and business unit managers. What should be considered and how strategic decisions should be made are the focus of the course. While the primary focus is on public corporations, not-for-profits, cooperatives, and small business strategic decisions are also included. The course is built around several high-level guest executives and a series of case studies. Improving oral and written communication skills in a business context is emphasized.

AEM (ARME) 425 Small Business Management Workshop

Fall. 4 credits. Limited to seniors. Prerequisite: AEM (ARME) 325 or NBA 300 and permission of instructor. Term project work will amount to approximately $100 per team. Lecs, M W 2:30–4:25. D. Streeter.

Students serve as counselors to small businesses in the central New York area and confront problems facing small personal enterprises. Encourages the application of business principles to an existing business and the witnessing of the results of firm-level decision making. Student teams meet with the business owners and course staff at arranged times during the semester.

AEM (ARME) 426 Cooperative Management and Strategies

Spring. 3 credits. Recommended: AEM (ARME) 220 or equivalent. Estimated cost of field trip, $60. Lecs, M W F 12:20–1:10. 2-day field trip required. B. L. Anderson.

Investigates the unique aspects of cooperative, membership, and not-for-profit organizations. Issues are approached from the point of view of management, the board of directors, and members. Topics include characteristics of various types of business organizations, cooperative principles, legislation, taxation, as well as the unique nature of strategies, management, financing, and marketing in cooperative, membership, and not-for-profit organizations. Primary focus is on operating cooperatives in agriculture, although alternative types of cooperative organizations are discussed, such as: credit unions, insurance cooperatives, employee stock ownership plans, housing cooperatives, flexible manufacturing networks, consumer cooperatives, and membership organizations.

AEM (ARME) 427 Advanced Agribusiness Management

Fall. 3 credits. Prerequisites: AEM (ARME) 220 or AEM (ARME) 302. Lecs, T R 1:25–2:40. B. A. Gloy.

The course is intended for students with an interest in agribusiness and is designed to integrate previous coursework and enhance problem identification and solving skills. The focus is on the evaluation, formulation, and implementation of strategy designed to create and sustain competitive advantage for agribusiness firms. The course covers industry analysis, firm analysis, market analysis and selection, risk analysis, strategy development, organizational design and structure, and leadership for agribusiness firms. This course is designed as a capstone course for the agribusiness management specialization.

AEM (ARME) 429 International Finance

Spring. 3 credits. Prerequisites: AEM (ARME) 210 and AEM (ARME) 324. Preference given to students in AEM. Lecs, T R 11:40–12:55, sec W 7:30–9:25 P.M. D. Ng.

The purpose of this course is to learn about issues in international financial management and international investment. The major issues that are discussed include exchange rate volatility, the benefit of international diversification, and the analysis of international capital budgeting decisions. Specific topics include the determination of the cost of capital for foreign investments, the determination and management of foreign exchange risks and country risks, and the use of innovative financing for the multinational corporation.

AEM (ARME) 430 International Trade Policy

Spring. 3 credits. Prerequisites: ECON 101–102 or equivalents and intermediate microeconomics. Recommended: AEM (ARME) 230. Lecs, T R 2:55–4:10. Optional section TBA. N. H. Chau.

This course examines the economic principles underlying international trade and monetary policy, and the policies, practices, and institutions that influence trade and foreign exchange markets. Applications to current topics in international trade policy, to trade in primary commodities, and to both developed and developing countries are also emphasized.

AEM (ARME) 431 Food and Agricultural Policies

Spring. 3 credits. Prerequisite: intermediate microeconomics. Lecs, T R 11:40–12:55; sec, R 2:30–3:20 or 3:35–4:25. H. de Gorter.

The course deals broadly with food and agricultural policies, including price support and storage or reserve policies, agricultural protection, soil conservation programs, the structure of agriculture, domestic food subsidy programs, environmental issues, and food safety. The importance of international trade and agricultural policies in other countries is emphasized.

AEM (ARME) 432 Markets or Governments?
Fall. 3 credits. Prerequisite: Intermediate microeconomics. Lec, T R 2:55–4:10. C. K. Ranney.
This course explores why certain economic activities occur in the private sector, through markets, or the public sector, through governments. Emphasis is on microeconomic analysis of public finance, public resource allocation, and the impact of those on private firm and consumer decisions. Topics include: perfectly competitive markets, market failure, public choice theory, government expenditure analysis, tax analysis, and government failure.

AEM (ARME) 433 Devolution, Privatization, and the New Public Management (also CRP 412)
Fall. 3 credits. S-U grades optional. Lec, M F 10:10–11:45. M. E. Warner.
For description, see CRP 412.

AEM (ARME) 434 Local Government Workshop (also CRP 418)
Spring. 4 credits. Prerequisite: AEM (ARME) 433. S-U grades optional. Lec, F 9:05–12:25. M. E. Warner.
For description, see CRP 418.

AEM (ARME) 443 Food-Industry Management
Fall. 4 credits. Limited to AEM (ARME) juniors and seniors in Business or Food Industry Management and grad students. Prerequisite: AEM (ARME) 240 or 448 or permission of instructor. Lecs, T R 11:40–12:55; sec T 2:55–4:10. G. A. German.
A case-study approach is used to examine the application of management principles and concepts to marketing and distribution problems of the food industry. Cases covering new product introductions, merchandising strategies, and investment decisions are included. Guest speakers from the food industry present case-study solutions at the Tuesday afternoon section.

AEM (ARME) 446 Food Marketing Colloquium
Fall. 1 credit. Limited to juniors and seniors with extensive course work in food industry management and marketing. R 3:35–4:25. D. J. Perosio.
AEM (ARME) 446 and 447 have been developed as a two-semester special seminar that provides the weekly focus for the Food Marketing Fellows Program. The seminar covers advanced topics in food marketing, many of which have an important international dimension and are presented by industry members. A number of field trips are taken. Students participate in research topics on various aspects of the food industry.

AEM (ARME) 447 Food Marketing Colloquium
Spring. 1 credit. Limited to juniors and seniors with extensive course work in food industry management and marketing. R 1:25–2:15. D. J. Perosio.
AEM (ARME) 446 and 447 have been developed as a two-semester special seminar that provides the weekly focus for the Food Marketing Fellows Program. The seminar covers advanced topics in food marketing, many of which have an important international dimension and are presented by industry members. A number of field trips are taken. Students participate in research topics on various aspects of the food industry.

AEM (ARME) 448 Food Merchandising
Spring. 3 credits. Limited to juniors and seniors. Prerequisite: AEM (ARME) 240. Lecs, T R 10:10–11:25. D. J. Perosio.
Covers merchandising principles and practices as they apply to food industry situations. The various elements of merchandising such as buying, pricing, advertising, promotion, display, store layout, profit planning and control, and merchandising strategy are examined. The consequences of food industry trends and initiatives for other industry members, public policymakers, and consumers are considered.

AEM (ARME) 449 Global Marketing Strategy
Spring. 3 credits. Prerequisite: a previous marketing course. Limited to juniors, seniors, and graduate students. M W 2:55–4:10. J. M. Hagen.
This course examines opportunities and challenges in the rapidly changing global marketplace. Topics include the decision to serve a foreign market, alternative strategies for entry into foreign markets (such as exporting or establishing a local subsidiary), and issues in implementing those strategies. The course includes case analysis and discussion.

AEM (ARME) 450 Resource Economics (also ECON 450)
Fall. 3 credits. Prerequisites: MATH 111, ECON 313, and a familiarity with EXCEL. Lecs, T R 2:55–4:10. J. M. Conrad.
Dynamic models of renewable, nonrenewable, and environmental resources are constructed to examine market allocation and optimal resource management.

AEM (ARME) 451 Environmental Economics and Policy (also ECON 409)
Spring. 3 credits. Prerequisites: ECON 313, or intermediate microeconomics course, and calculus. Limited to undergraduate students. S-U grades optional. Lecs, T R 1:25–2:40. W. D. Schulze.
This course explores the economic foundations for public decision making about environmental commodities and natural resources, using tools from intermediate microeconomics. Emphasis is placed on the welfare economic approach for allocating public goods, with specific emphasis on market failure, externalities, benefit-cost analysis, and the use of nonmarket valuation techniques. Property rights/institutional perspectives and ecological economic concepts are also examined.

AEM (ARME) 464 Economics of Agricultural Development (also ECON 464)
Spring. 3 credits. Prerequisites: ECON 101–102, or permission of instructor. Lecs, T R 11:40–12:55. R. D. Christy.
This course is designed to provide an understanding of the economics of the agricultural sector in low-income countries. In addition, more general issues of economic development beyond the agricultural sector are covered to provide the necessary context for an understanding of rural problems. Among the areas covered are the nature of development and technical change, welfare and income distribution, land reform, food and nutrition policy, food security and food aid, competition with more developed countries and international markets, the effect of U.S. policy on agricultural development, and the role of international institutions. Examples from a wide variety of developing countries are used to illustrate the basis for economic analysis.

AEM (ARME) 494 Undergraduate Special Topics in Applied Economics and Management
Fall or spring. 4 credits maximum. S-U grades optional. Staff.
The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the beginning of the semester.

AEM (ARME) 497 Individual Study in Applied Economics and Management
Fall or spring. Variable credit. S-U grades optional. Students must register with an Independent Study form (available in the Undergraduate Program Office in Warren Hall). Staff.
Used for special projects designed by faculty members.

AEM (ARME) 498 Supervised Teaching Experience
Fall or spring. 1–4 credits. Total of 4 credits maximum during undergraduate program. Students must register with an Independent Study form (available in the Undergraduate Program Office in Warren Hall). Staff.
Designed to give qualified undergraduates experience through actual involvement in planning and teaching courses under the supervision of department faculty. Students are expected to teach at least one hour per week for each credit awarded. Students cannot receive both pay and credit for the same hours of preparation and teaching.

AEM (ARME) 499 Undergraduate Research
Fall, spring, or summer. 1–4 credits. Limited to students with GPAs of at least 2.7. Students must register with an Independent Study form (available in the Undergraduate Program Office in Warren Hall). S-U grades optional. Staff.
Permits outstanding undergraduates to carry out independent study of suitable problems under appropriate supervision. Students cannot receive both pay and credit for the same hours of work.

AEM (ARME) 555 Environmental Management and Policy
Fall. 3 credits. Prerequisite: ECON 101 and 102 or equivalents and calculus. Lecs, M W F 11:15–12:05. L. D. Chapman.
This seminar intends to familiarize students with the rapidly evolving state of the art in the analysis and management of environmental policy and practice in enterprise. Although focused on the private sector, some attention is given to public enterprises.

AEM (ARME) 605 Agricultural Finance
Fall. 3 credits. Prerequisite: AEM (ARME) 324 or 405 or equivalent. T R 8:40–9:55. B. A. Gloy.
Advanced topics in agricultural finance. Topics include investment analysis, capital budgeting under uncertainty, decision analysis, risk management, capital structure, and financial intermediaries.

AEM (ARME) 608 Production Economics (also ECON 408)
Fall. 3 credits. Recommended: ECON 313 and MATH 111 or equivalents. Lecs, M W F 10:10–11. L. W. Tauer.

The theory of production economics with emphasis on applications to agriculture and natural resources. Topics include the derivation, estimation, and use of production, cost, profit, demand, and supply functions. Production response over time and under risk is introduced.

AEM (ARME) 630 Policy Analysis: Welfare Theory, Agriculture, and Trade (also ECON 430)

Spring. 4 credits. Prerequisites: AEM (ARME) 608 or PAM 603, ECON 313, or equivalent intermediate micro theory incorporating calculus. Lecs, M W 12:20–2:15. H. de Gorter.

The first half of the course surveys the theory of welfare economics as a foundation for public policy analysis. Major issues addressed include the problem of social welfare measurement, the choice of welfare criteria, and the choice of market or nonmarket allocation. Basic concepts covered include measurement of welfare change, including the compensation principle, consumer and producer surplus, willingness-to-pay measures, externalities, and the general theory of second-best optima. The second half of the course focuses on public policy analysis as applied to domestic agricultural policy and international trade. The domestic policy component examines major U.S. farm commodity programs and related food and macroeconomic policies and analyzes their effects on producers, consumers, and other groups. The international trade component examines the structure of world agricultural trade, analytical concepts of trade policy analysis, and the principal trade policies employed by countries in international markets.

AEM (ARME) 632 Open Economy Analysis: Theory and Applications

Spring. 3 credits. Prerequisites: ECON 313, ECON 314, and permission of instructor. S-U grades optional. Lecs, T R 11:40–12:55. N. Chau and S. Kyle.

This course explores both recent theoretical and methodological advances as well as practical applications in analyzing current topics and issues in open economies. It brings together research methods pertinent to open economy macroeconomics and international trade policies, to give students a basic understanding of how different aspects of contemporary debates are analyzed in practice.

AEM (ARME) 633 Devolution, Privatization, and the New Public Management (also CRP 612)

Fall. 3 credits. S-U grades optional. Lec, M F 10:10–11:45. M. E. Warner.

For description, see CRP 612.

AEM (ARME) 634 Local Government Workshop (also CRP 618)

Spring. 4 credits. Prerequisite: AEM (ARME) 633. S-U grades optional. Lec, F 9:05–12:25. M. E. Warner.

For description, see CRP 618.

AEM (ARME) 640 Analysis of Agricultural Markets (also ECON 440)

Fall. 3 credits. Prerequisites: AEM (ARME) 411 and 415 or equivalents. Lecs, T R 2:55–4:10. H. M. Kaiser.

This course focuses on the unique features of agricultural commodity markets. Focus is placed on government and private institutions impacting these markets, as well as on models of price behavior including marketing margins and imperfect competition. Empirical tools to evaluate market characteristics are also covered.

AEM (ARME) 641 Commodity Futures Markets (also ECON 441)

Spring, weeks 8–14 (starts Mar. 11). 2 credits. Prerequisites: AEM (ARME) 411 and 415 or equivalents. Recommended: AEM (ARME) 640. Lecs, T R 12:20–2:15. W. G. Tomek.

This course is about markets for agricultural futures contracts. Emphasis is placed on models of price behavior on futures markets including relationships among cash and futures prices. These principles provide a foundation for a discussion of hedging, speculation, and public-policy issues.

AEM (ARME) 651 Environmental and Resource Economics

Spring. 4 credits. Limited to graduate students. Lecs, T R 10:10–11:25. W. D. Schulze.

A review of welfare economics, environmental externalities, and common property resources, and a survey of current environmental and natural resource policy. Techniques for measuring benefits and cost—including property value and wage, hedonic approaches, travel cost models, and contingent valuation—are covered. Survey/data collection methods are described in detail. Innovative market mechanisms for resolving public good, common property, and externality problems are explored. Students are required to complete a paper describing their own formal economic analysis of a natural resource or environmental problem. Open to graduate students outside of economics. AEM (ARME) 651 is a core course for the Environmental Management concentration/option.

AEM (ARME) 652 Land Economics Problems (co-listed with CEE 529)

Fall or spring. 1 or more credits. Limited to graduate students. Prerequisite: permission of instructor. S-U grades optional. W 7:30–9:25 P.M. D. J. Allee.

Special work on any subject in the field of land and resource economics.

AEM (ARME) 655 Electric Systems Engineering and Economics (also ECE 551)

Fall. 2 credits. Prerequisites: basic calculus and microeconomics. Lecs, to be arranged. T. D. Mount and R. Thomas.

For description, see ECE 551.

AEM (ARME) 660 Agroecosystems, Economic Development and the Environment

Spring. 3 credits. Prerequisites: introductory microeconomics and intermediate statistics (i.e. including multiple regression) or permission of instructor. Limited to graduate students. An additional section will be arranged for economics majors. S-U grades optional. Lecs, M W 2:55–4:10. D. R. Lee.

This course examines selected topics in agricultural and economic development, technology assessment, ecosystem management and the environment, with a focus on developing countries. Topics covered include production, poverty, and environmental tradeoffs; sustainable technology development; trade and environment linkages; economics of conservation and development; and alternative methodologies for analyzing these interactions. Readings emphasize the economic literature, but also draw from the biophysical sciences, ecosystem management, and the social sciences. This course is open to graduate students outside of economics.

AEM (ARME) 665 Food and Nutrition Policy (also NS 685)

Spring. 3 credits. Prerequisites: introductory microeconomics and intermediate statistics (i.e. through multiple regression), or permission of instructor. S-U grades optional. Lecs, M W 2:55–4:10. D. Sahn.

For description, see NS 685.

[AEM (ARME) 666 Economics of Development (also ECON 466)

Spring. 3 credits. Prerequisites: ECON 313 and 314 or permission of instructor. S-U grades optional. Lecs, T R 11:40–12:55. Not offered spring 2002. S. C. Kyle.

The course is designed as an introduction to the economics of development at the graduate level. The course is split into two major sections, the first dealing with the microeconomics of households in developing countries and the second covering macroeconomic strategy and performance. A principal goal is to illuminate the particular features of low-income countries which are important to economic analysis and policy. Special attention is given to issues facing countries with important agricultural and resource sectors.]

AEM (ARME) 667 Topics in Economic Development (also ECON 770)

Fall. 3 credits. Prerequisite: basic first-year courses in ECON or AEM (ARME), or instructor's permission. S-U grades optional. Lecs, W 1:25–4:25. R. Kanbur.

This course is targeted to second-year graduate students. Topics covered vary from year to year but may include: poverty, inequality, intra-household allocation, structural adjustment, and debt. Examination is by term paper.

AEM (ARME) 670 Economics of Consumer Demand (also PAM 608)

Fall. 3 credits. Prerequisites: ECON 311 or 313 and 2 semesters of calculus. S-U grades optional. Lecs, T R 10:10–11:25. C. K. Ranney.

A graduate level introduction to theory and empirical research on household demand, consumption, and saving. Emphasis is on the use of the theory in empirical research. Topics include neo-classical theory of demand, duality, complete demand systems, conditional demand, demographic scaling and translating, consumption, and savings. As time allows, Becker and Lancaster models of demand may be introduced.

AEM (ARME) 694 Graduate Special Topics in Applied Economics and Management

Fall or spring. 4 credits maximum. S-U grades optional. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the beginning of the semester.

AEM (ARME) 698 Supervised Graduate Teaching Experience

Fall or spring. 1–4 credits. Total of 4 credits maximum during graduate program. Students must register with an Independent Study form (available in the Undergraduate Program Office in Warren Hall). Open only to graduate students.

Undergraduates should enroll in AEM 498. S-U grades optional. Prerequisite: permission of instructor. Staff.

Designed to give graduate students teaching experience through involvement in planning and teaching courses under the supervision of departmental faculty members. The experience may include leading discussion sections, preparing, assisting in, or teaching lectures and laboratories, and tutoring. Students are expected to actually teach at least one hour per week for each credit awarded. Students cannot receive both pay and credit for the same hours of preparation and teaching.

AEM (ARME) 699 M.P.S. Research

1–6 credits. Prerequisite: registration as an M.P.S. student. Credit is granted for the M.P.S. project report. Staff.

AEM (ARME) 700 Individual Study in Applied Economics and Management

Fall or spring. Limited to graduate students. S-U grades optional. Credit, class hours, and other details arranged with a faculty member. Staff.

This course is used for special projects designed by faculty members. More than one topic may be given each semester in different sections. The student must register in the section appropriate to the topic being covered; the section number is provided by the instructor.

[AEM (ARME) 708 Advanced Production Economics

Fall. 3 credits. Prerequisite: AEM (ARME) 608, 710, or equivalents; ECON 609 is highly recommended. Offered alternate years. Offered fall 2002 and 2004. Not offered fall 2001. Hours TBA. R. N. Boisvert.

Covers theoretical and mathematical developments in production economics, with emphasis on estimating production relationships, scale economies, technical change, and factor substitution. Developments in flexible functional forms, duality, and dynamic adjustment models are emphasized. Discussions of other topics (risk, supply response, and household production functions) based on student interest.]

AEM (ARME) 710 Econometrics I

Spring. 3 credits. Prerequisites: statistical methods at the level of ILRST 311 or ECON 619. Undergraduates must have permission of instructor. Lecs, M W F 9:05–9:55. T. D. Mount.

This course, together with AEM (ARME) 711, provides a graduate sequence in applied econometrics that is suitable for M.S. and Ph.D. students. AEM (ARME) 710 covers linear regression models and the associated estimation and testing procedures. Models from demand and production theory are used as illustrations.

AEM (ARME) 711 Econometrics II

Fall. 3 credits. Prerequisite: AEM (ARME) 710 or equivalent. Lecs, M W F 10:10–11:00. T. D. Mount.

Coverage beyond AEM (ARME) 710 of dynamic models, including single equation ARIMA, vector ARIMA, Kalman filtering, structural dynamic models, and regime switching. Topics covered include endogeneity, stability, causality, and cointegration.

[AEM (ARME) 712 Quantitative Methods I

Fall. 4 credits. Prerequisite: some formal training in matrix algebra. A course at the level of BTRY 417 is highly recommended. Lecs, M W F 8:40–9:55. Not offered fall 2001. R. N. Boisvert.

A comprehensive treatment of linear programming and its extensions, including postoptimality analysis. Topics in nonlinear programming, including separable, spatial equilibrium and risk programming models. Input-output models and their role in social accounting matrices and computable general equilibrium models are discussed. Applications are made to agricultural, resource, and regional economic problems.]

AEM (ARME) 713 Quantitative Methods II

Spring. 3 credits. Prerequisite: ECON 609. S-U only. Lecs, T R 8:40–9:55. J. M. Conrad.

This course is concerned with the analysis and optimization of dynamic systems. Course objectives are to (1) present the basic theory of dynamical systems and dynamic optimization, (2) introduce associated methods of optimization and numerical analysis, (3) review some applications of dynamic analysis from various subfields in economics, and thereby (4) equip students with basic theory and methods to perform applied research on dynamic allocation problems.

AEM (ARME) 714 Experimental Economics

Fall. 4 credits. Prerequisite: ECON 609. Offered alternate years. Offered fall 2001 and 2003. Not offered fall 2002. Lecs TBA. W. D. Schulze.

The course will survey both experimental economics methods and research as an approach to test economic theory. Students will participate as subjects in a series of illustrative computerized experiments ranging from double auctions to public goods provision. Topics covered include experimental methods; decisions and games; markets (testing auction institutions); market power (monopoly, oligopoly); bargaining, compensation and performance; public goods; externalities and voting; information and uncertainty; and economic anomalies. Students must design and write a paper describing their own experiment.

AEM (ARME) 717 Research Methods in Agricultural Economics

Spring. 2 credits. Limited to graduate students. T 2:30–4:25. R. N. Boisvert.

Discussion of the research process and scientific method as applied in agricultural economics. Topics include problem identification, hypotheses, sources of data, sampling concepts and designs, methods of collecting data, questionnaire design and testing, field organization, and analysis of data. During the semester each student develops a research proposal that may be associated with his or her thesis.

[AEM (ARME) 730 Seminar on International Trade Policy: Agriculture, Resources and Development

Spring. 3 credits. Limited to graduate students. Prerequisites: AEM (ARME) 630 or equivalent. Offered alternate years. Not offered spring 2002 and 2004. Next offered spring 2003. Hours TBA. D. R. Lee.

This course examines selected topics in the professional literature on international trade policy, focusing on agricultural trade and related topics, including trade liberalization, trade and environmental linkages, technological change and trade policy, and agricultural trade and development.]

AEM (ARME) 735 Public Finance: Resource Allocation and Fiscal Policy (also ECON 735)

Fall. 4 credits. Time TBA. R. Kanbur.

For description, see ECON 735.

AEM (ARME) 740 Agricultural Markets and Public Policy

Spring, weeks 1–7. 2 credits. Limited to graduate students. Prerequisite: familiarity with multiple regression techniques at the AEM (ARME) 411 level or higher. Recommended: AEM (ARME) 640. T R 12:20–2:15. W. H. Lesser.

Develops the concepts and methodology for applying and analyzing the effects of public-policy directives to the improvement of performance in the U.S. food marketing system. Prospective topics include a survey of industrial organization principles, antitrust and other legal controls, and coordination systems in agriculture. Topics may be adjusted to students' interests.

AEM (ARME) 750 Resource Economics

Fall. 3 credits. Prerequisites: ECON 609 and 618, or AEM (ARME) 713. Lecs, T R 8:40–9:55. J. M. Conrad.

Optimal control and other methods of dynamic optimization are used to study the allocation and management of natural resources.

[AEM (ARME) 751 Environmental Economics

Spring. 4 credits. Prerequisites: ECON 609 and 618, or AEM (ARME) 713. S-U grades optional. Hours TBA. Offered alternate years. Not offered spring 2002 and 2004. Next offered spring 2003. R. N. Boisvert.

This course is the study of the basic theory and applications of environmental economics and policy. Extensions include comparisons of taxes, subsidies and other policy instruments, an examination of the effects on policy of market imperfections, multiple positive and negative externalities, and other government regulations such as those in agriculture. Also examined are the effects of uncertainty, and special problems associated with non-point externalities and asymmetric information. There is an extensive treatment and evaluation of contingent valuation and other methods for valuing non-market goods. Throughout, the theoretical results are highlighted through discussions of important empirical policy applications.]

AEM (ARME) 762 Microeconomics of International Development

Fall. 3 credits. Prerequisite: completion of first year Ph.D. course sequence in AEM (ARME) or ECON, or instructor's permission. S-U grades optional. Lecs, T R 2:30–4:00. C. B. Barrett.

This course focuses on models of individual, household, firm/farm, and market behavior in low- and middle-income developing economies. Topics covered include: agricultural land, labor and financial institutions, technology adoption, food security and nutrition, risk management, intra-household analysis, reciprocity networks, and product/factor markets analysis. Empirical investigation is emphasized.

[AEM (ARME) 763 Macro Policy in Developing Countries
Spring. 3 credits. Prerequisites: ECON 609, 610, 613 (may be taken concurrently), or permission of instructor. Offered alternate years. Not offered spring 2002 and 2004; next offered spring 2003. Lec, T 2–4:25. S. C. Kyle.
This course examines macroeconomic policies in developing countries and their interaction with economic growth, development, and stability. Theoretical models useful for analysis of macro policies are covered as well as an examination of empirical studies. Emphasis is on research topics of current interest to students and professionals in the field, particularly those relating to the interaction of macro policy with micro and sectoral analysis.]

AEM (ARME) 800 Master's-Level Thesis Research
Fall or spring. 1–9 credits. Prerequisite: permission of graduate committee chair. S-U grades only. Graduate faculty.
For students admitted specifically to a master's program.

AEM (ARME) 900 Graduate-Level Thesis Research
Fall or spring. 1–9 credits. Prerequisite: permission of graduate committee chair. S-U grades only. Graduate faculty.
For students in a Ph.D. program **only before** the "A" exam has been passed.

AEM (ARME) 901 Doctoral-Level Thesis Research
Fall or spring. 1–9 credits. Prerequisite: permission of graduate committee chair. S-U grades only. Graduate faculty.
For students admitted to candidacy **after** the "A" exam has been passed.

ANIMAL SCIENCE

A. W. Bell, chair; R. E. Austic, D. E. Bauman, R. W. Blake, Y. R. Boisclair, D. L. Brown, W. R. Butler, L. E. Chase, G. F. Combs, W. B. Currie, H. N. Erb, R. W. Everett, D. G. Fox, D. M. Galton, R. C. Gorewit, H. F. Hintz, P. A. Johnson, K. Keshavarz, X. G. Lei, E. A. Oltenacu, P. A. Oltenacu, T. R. Overton, J. E. Parks, A. N. Pell, E. J. Pollak, R. L. Quaas, S. M. Quirk, R. D. Smith, M. L. Thonney, M. E. Van Amburgh

AN SC 100 Domestic Animal Biology I
Fall. 4 credits. S-U grades optional. Lecs, M W F 9:05; sec, T W or R 2–4:25. W. B. Currie.
An introduction to the biology of economically important species (morphology, anatomy, and physiology) and its application to the management of animals in major livestock industries. Topics covered include: fundamentals of genetic selection and relevant biometry, anatomy, quantitative cell biology, regulatory mechanisms, public domain genetic databases, major life support systems, and digestion. Students undertake the care and management of several species of farm animals and conduct a genetic selection experiment with a large colony of Japanese quail. Laboratory exercises include examining aspects of growth and development. Living farm animals are used noninvasively, and fresh organs from dead animals are examined.

AN SC 105 Contemporary Perspectives of Animal Science
Spring. 1 credit. Limited to freshmen, sophomores, and first-year transfers. T 1:25 or W 12:20. R. C. Gorewit and D. J. Cherney.
A forum to discuss the students' career planning and the contemporary and future role of animals in relation to human needs.

AN SC 110 The Animals That Sustain Us
Spring. 3 credits. S-U grades optional. Lecs, T R 9:05; lab, T 1:25–4:25. D. L. Brown.
Students completing this course understand the importance of the symbiosis between humans and domestic animals, learn how animal enterprises can be ethically, environmentally and economically sound, and are able to care for various species of domestic animals. Lab sessions feature both live farm animals and computer simulations.

AN SC 120 Animal Domestication and Behavior
Fall. 3 credits. T R 8:40–9:55. E. A. Oltenacu.
This Freshman Writing Seminar explores the relationship between humans and their domestic animals. Students study the role of animal behavior in the domestication process, both historically and in modern attempts to domesticate new species, and in finding solutions to current issues related to animal welfare.

AN SC 150 Domestic Animal Biology II
Spring. 4 credits. S-U grades optional. Lec, M W F 9:05; lab/disc T W or R 2–4:25. W. R. Butler and staff.
Second of a two-semester sequence (100/150) applying the basic biology of growth, defense mechanisms, reproduction, and lactation to aspects of the production and care of domestic animals. Fresh tissues and organs from dead animals along with preserved specimens are used in laboratories, exercises, and demonstrations. A quail colony will be used for growth exercises and data collection.

AN SC 212 Animal Nutrition
Fall. 4 credits. Prerequisite: CHEM 208 or equivalent. Recommended: AN SC 100 and 150. Lecs, M W F 10:10; lab, M T W R or F 1:25–4:25. A. W. Bell and D. J. R. Cherney.
An introduction to animal nutrition, including digestive physiology and metabolism of domestic animals and other species; nutrient properties and requirements for different aspects of animal production and performance; principles of feed evaluation and ration formulation. Laboratory classes include gastrointestinal tract dissections and a nutritional experiment performed on a laboratory or farm animal species.

[AN SC 213 Nutrition of the Dog
Spring, weeks 1–7. 1 credit. Prerequisite: AN SC 212 or equivalent. Offered alternate years. Next offered spring 2003; not offered spring 2002 or 2004. Lecs W 7:30–9:25 P.M. H. F. Hintz.
Nutrition of the dog. Digestive physiology, nutrient requirements, feeding practices, and interactions of nutrition and disease.]

AN SC 214 Nutrition of Exotic Animals
Spring, weeks 1–7. 1 credit. Prerequisite: AN SC 212. Offered alternate years. Next offered spring 2002, 2004; not offered spring 2003. Lec, W 7:30–9:25 P.M. H. F. Hintz.
Principles of nutrition for exotic animals. Nutrient requirements, sources of nutrients, feeding management systems, and ration formulation are discussed. Signs of nutrient deficiencies and excesses are described.

AN SC 215 Exotic Avian Husbandry and Propagation
Fall. 2 credits. Limited to 100 students. Prerequisites: AN SC 100, 150 or one year of introductory biology. Lec, M 2:30–4:30. J. Parks and D. Muscarella.
Natural history, care, management, health, and breeding of exotic avian species with emphasis on psittacines (parrots and related species) and raptors (birds of prey). Includes lectures, demonstrations, and local field trips.

[AN SC 216 Nutrition of the Cat
Fall, weeks 1–7. 1 credit. Prerequisite: AN SC 212 or equivalent. Offered alternate years. Next offered fall 2002; not offered fall 2001 or 2003. Lecs, W 7:30–9:25 P.M. H. F. Hintz.
Nutrition of the cat. Digestive physiology, nutrient requirements, feeding practices, and interactions of nutrition and disease.]

AN SC 221 Introductory Animal Genetics
Spring. 3 credits. Prerequisite: a year of college biology. Lecs, T R 9:05; sec, T W R or F 2–4:25. E. J. Pollak.
An examination of basic genetic principles and their application to the improvement of domestic animals, with emphasis on the effects of selection on animal populations.

AN SC 222 Introduction to Canine Genetics
Fall, spring or summer. 1 credit. Prerequisites: introductory biology or permission of instructor. To receive credit, register through the School of Continuing Education, http://www.sce.cornell.edu/DL/html/caninegenetics.html. E. J. Pollak and P. A. Oltenacu.
Introduction to basic Mendelian genetics and simply inherited characteristics in the dog. This distance-education course delivered by CD and web interaction for residents and nonresidents consists of lectures on basic genetic principles, probabilities, linkage and genetic testing, and seminars on genome mapping, inherited sexual disorders, bleeding disorders, and eye defects. This course cannot be taken for credit by students who have successfully completed AN SC 221.

AN SC 250 Dairy Cattle Principles
Fall. 3 credits. S-U grade optional. Lecs, T R 10:10; lab, T 1:25–4:25. D. M. Galton and T. Batchelder.
Introduction to the background and scientific principles relating to dairy cattle production. Laboratories are designed to provide an understanding of production techniques. This course is a prerequisite for AN SC 251, 351, and 355.

AN SC 251 Dairy Cattle Selection
Fall. 2 credits. Prerequisite: AN SC 250 or equivalent. S-U grades optional. Lec, W 1:25–2:15; disc, W 2:15–4:25. D. M. Galton.
Covers the application of scientific principles of genetic programs in herds with different breeding programs. Emphasis is on economical traits to be used to improve genetic progress and herd profitability.

AN SC 265 Horses
Fall. 3 credits. Prerequisites: AN SC 100 and 150 or permission of instructor. S-U grades optional. Lecs, T R 9:05; lab, R 1:25–4:25. C. Collyer.

Selection, management, feeding, breeding, and training of light horses.

AN SC 280 Molecular Biology in Agriculture and Medicine
Fall. 2 credits. Prerequisite: one year of introductory biology. Lec, T R 10:10. S. M. Quirk.
The applications of molecular biology to animal research, animal agriculture, industry, and medicine are discussed. An introduction of basic recombinant DNA techniques is followed by topics such as genome projects, functional genomics, transgenic animal production, mammalian cloning, gene therapy, and genetic screening. Ethical issues raised by use of these techniques are discussed.

AN SC 290 Meat Science (also FOOD 290)
Fall. 2 or 3 credits. Lecs, T R 11:15; lab, M or R 12:20–3:20. Lecture only, 2 credits; lecture plus lab, 3 credits; lab cannot be taken without lecture. D. Shaw.
An introduction to meat science through a study of the structure, composition, and function of muscle and its conversion to meat. Properties of fresh and processed meat, microbiology, preservation, nutritive value, inspection, and sanitation are also studied. Laboratory exercises include anatomy, meat-animal slaughter, meat cutting, wholesale and retail cut identification, inspection, grading, curing, sausage manufacture, and quality control. An all-day field trip to commercial meat plant may be taken.

AN SC 300 Animal Reproduction and Development
Spring. 3 credits. Prerequisite: AN SC 100–150 or equivalent and 1 year of introductory biology. Lecs, M W F 10:10. J. E. Parks.
Comparative anatomy and physiology of mammalian and avian reproduction, with emphasis on domestic and laboratory animals. Fertilization through embryonic development, pregnancy, and growth to sexual maturity; emphasis on physiological mechanisms and application to fertility regulation. Separate laboratory offered to demonstrate fundamental aspects of reproduction and reproductive technology.

AN SC 301 Animal Reproduction and Development Lab
Spring. 1 credit. Prerequisite: AN SC 100–150 or equivalent. Concurrent enrollment in or completion of AN SC 300 required to register. Labs, M W or F 1:25–4:25. Each lab limited to 30 students. J. E. Parks.
Demonstration of fundamental principles and applied aspects of mammalian and avian reproduction. A limited number of live animals are used in some demonstrations. Dissection and examination of tissues from vertebrate animals are included in selected laboratories.

AN SC 305 Farm Animal Behavior (also BIOAP 312)
Spring. 2 credits. Prerequisites: introductory animal physiology (AN SC 100 and 150 or equivalent); at least 1 animal production course or equivalent experience is recommended. S-U grades optional. Lec, T R 11:15. E. A. Oltenacu and K. A. Houpt.
The behavior of production species (avian and mammalian) influences the success of any management program. Students study behaviors relating to communication, learning, social interactions, reproduction, and feeding of domestic animals and their physiological basis. Management systems for commercial livestock production and their implications for animal behavior and welfare are stressed.

AN SC 321 Applied Animal Genetics Seminar
Fall. 2 credits. Prerequisite: AN SC 221 or equivalent. S-U grades only. Lec, M 12:20; disc, M 1:25. P. A. Oltenacu and E. J. Pollak.
Topics of interest related to the genetic definition and control of qualitative and quantitative traits in various species of animals are presented. Genetic conservation programs and current animal improvement strategies as well as challenges presented by new developments in reproductive biology and molecular genetics are addressed in a lecture discussion-type format.

AN SC 323 Equine Genetics Seminar
Fall. 1 credit. Prerequisite: AN SC 221 or equivalent. S-U grades only. Disc, T 1:25-2:15. P. A. Oltenacu and staff.
Topics of equine genetics are presented and discussed. Independent library research, a short written paper, and an oral presentation are important parts of this course. Lecture topics may include the genetic aspects of color, abnormalities, metabolic diseases, unsoundness, and performance.

AN SC 330 Poultry Biology, Nutrition, and Management
Spring. 2 credits. Prerequisites: AN SC 100 and 150 or permission of instructor. Offered alternate years. Next offered spring 2002, 2004; not offered spring 2003. Lec, F 2–4 (occasional field trips run past 4 P.M.). K. Keshavarz.
The course focuses on anatomy and physiology of various organs of poultry. Principles of poultry nutrition, breeding, and embryology are discussed with an emphasis on their practical application. The student becomes familiar with the concept of least-cost feed formulation for poultry. The course also is designed to provide an understanding of current technology involved in commercial poultry production.

[AN SC 341 Biology of Lactation
Spring. 2 credits. Prerequisite: AN SC 100–150 or Animal Physiology. Offered alternate years. Next offered spring 2003; not offered spring 2002, 2004. Lecs, T R 9:05. Y. R. Boisclair and staff.
A comprehensive survey of the biology of the mammary gland. Lectures cover: (1) basic aspects such as anatomy and development of the mammary gland, biochemistry and hormone regulation of milk synthesis and regulation of gene expression in the mammary cells; (2) practical aspects such as the impact of lactation on nutrition, reproduction, and diseases. Lactation in the dairy cow provides the primary context to the course, but examples from other mammals including humans are used.]

AN SC 351 Dairy Herd Management
Spring. 4 credits. Prerequisites: AN SC 250 or permission of instructor. Recommended: AEM (ARME) 302. Lecs, M W F 11:15; labs, W 1:25–4:25, and F (alternate weeks) 1:25–4:25. D. M. Galton and T. L. Batchelder.
Application of scientific principles to practical herd management with components of reproduction, milking, housing, records, and production economics. Laboratories emphasize practical applications, analyses of alternatives, decision making, field trips, and discussion.

AN SC 355 Dairy Nutrition and Health
Spring. 3 credits. Prerequisite: AN SC 250 and permission of instructor. Letter only. Lecs, T R 10:10; lab, M 1:25–4:25. D. M. Galton, L. E. Chase and T. L. Batchelder.
Application of scientific principles to practical herd management with components of nutrition and herd health. Laboratories emphasize practical applications, analyses of alternatives, decision making, field trips, and discussion.

AN SC 360 Beef Cattle
Spring. 3 credits. Lec, T R 10:10; sec, W 2:00–4:25. Offered alternate years. Next offered spring 2002, 2004; not offered spring 2003. M. L. Thonney.
Emphasis is on the management of reproduction, nutrition, and selection in beef cattle enterprises. A cattle growth model is studied. Laboratories acquaint students with management skills through computerized simulations and working directly with cattle. Students spend several days during the semester feeding and caring for cows and their newborn calves.

AN SC 365 Equine Nutrition
Fall. 3 credits. Prerequisites: AN SC 100, 212, and 265 or equivalent. S-U grades optional. Lec, M W F 9:05–9:55. H. F. Hintz.
The principles of nutrition for horses are presented. Digestive physiology, sources of nutrients, feeding programs for various classes of horses and interactions of nutrition and diseases are discussed.

[AN SC 370 Swine Nutrition and Management
Fall. 3 credits. Recommended: AN SC 212. Lec, T R 11:15; lab, T 2–4:25. Offered alternate years. Next offered fall 2002; not offered fall 2001, 2003. X. G. Lei and K. Roneker.
This course focuses on swine nutrition, feeding, and management. Lectures are integrated basic nutrition and swine system including pig biology, digestive and metabolic development, nutritional biochemistry and physiology, impact of swine nutrition on environment, use of pig model in medicine, and current swine nutrition and biotechnology. Laboratory practice, animal projects, and problem troubleshooting are offered.]

[AN SC 380 Sheep
Spring. 3 credits. Lec, T R 10:10; sec, W 2:00–4:25. Offered alternate years. Next offered spring 2003; not offered spring 2002, 2004. M. L. Thonney.
Emphasis is on the breeding, feeding, management, and selection of sheep from a production-system approach. Lectures and laboratories are designed to give students a practical knowledge of sheep production as well as the scientific background for improved management practices. Students work directly with sheep during laboratories and spend several days during the semester feeding and caring for ewes and their newborn lambs.]

AN SC 400 Livestock in Tropical Farming Systems
Spring. 3 credits. Prerequisite: upperclass standing. Lecs, T R 9:05; disc W 1:25–3:20. R. W. Blake.

An analysis of constraints on livestock production in developing countries of the tropics, economic objectives and risk, and production methods. Emphasis is on strategic use of animal and plant resources, animal performance with inputs restricted, decision making, and alternative systems of production. Principles, real examples, independent study projects, and classroom interactions aid problem-solving efforts to improve food security.

AN SC 401 Dairy Production Seminar
Spring. 1 credit. Limited to juniors and seniors. Disc, M 7:30 P.M. D. E. Bauman and T. R. Overton.
Capstone course where students, with the help of faculty members, complete a study of the research literature on topics of current interest in the dairy industry. Students then make an oral and a written report on their topic with emphasis on integrating theory and practice.

AN SC 402 Seminar in Animal Sciences
Spring. 1 credit. Limited to juniors and seniors. May be repeated. S-U grades optional. Lec, M 4:30. W. B. Currie.
Review of literature pertinent to topics of animal science or reports of undergraduate research and Honors projects. Students present oral reports of their work for class discussion in addition to written reports.

[AN SC 403 Tropical Forages
Spring. 2 credits. Limited to seniors and graduate students except by permission of instructor. Prerequisites: crop production and livestock nutrition. Offered alternate years. Next offered spring 2003; not offered spring 2002, 2004. Lecs, T R 10:10. A. N. Pell.
An overview of tropical grasslands, seeded pastures, and crop residues as feed resources; grass and legume characteristics; establishment and management of pastures; determination of feeding value of forages and crop residues; physiology of digestion of ruminants that affects feeding behavior; problems of chemical inhibitors in plants; and preservation of tropical forages as hay or silage.]

AN SC 410 Nutritional Physiology and Metabolism
Fall. 3 credits. Prerequisites: biochemistry and physiology. M W F 11:15. R. E. Austic and D. E. Bauman.
A fundamental approach to nutrition focusing on the metabolic fate of nutrients and the interrelationships among nutrients, nutritional state, and metabolic processes. The overall goal is to increase understanding of metabolism and metabolic regulation through an integration of nutrition, biochemistry, and physiology.

AN SC 411 Applied Cattle Nutrition
Fall. 4 credits. Prerequisites: AN SC 100 and 212 (or equivalent); AN SC 355 is strongly encouraged. Lecs, M W F 10:10; lab, M 1:25–4:25. M. E. Van Amburgh.
An applied approach to predicting nutrient requirements and feed utilization to meet requirements with wide variations in cattle type, feed composition, and environmental conditions. Dairy cattle are emphasized. Nutrient management to minimize cost of production and environmental effects is discussed. Computer models (Cornell Net Carbohydrate and Protein System) are used in the laboratory to apply the information presented in lectures, including evaluation of feeding programs on case study farms. Course is designed for juniors, seniors, and entering graduate students.

AN SC 412 Livestock and the Environment
Spring. 2 or 4 credits. No prerequisite for 2 credits (weeks 1–8). Students who have taken AN SC 411 can sign up for 4 credits (full semester) to take the lab section, which involves whole-farm environmental planning. Lec, T R 11:15–12:05; lab T 1:30–4:30. D. G. Fox.
This course explores controversial issues surrounding livestock and the environment, including competition with humans for food resources, impact of animal products on human health, and impact of livestock farms on environmental/community problems, including odor, pathogens, and excess nutrient effects on water quality. Those taking the lab section for two additional credits use computer software tools to evaluate aspects of whole-farm nutrient and environmental management on case study farms, with data collection and analysis continuing throughout the semester.

AN SC 414 Ethics and Animal Science
Fall. 2 credits. Enrollment limited to 20 students, juniors and seniors only. Lec, M 12:20; disc, W 12:20–1:10. One Saturday morning, required farm tour. D. J. R. Cherney.
Exploration of the place of humans in the biological world, origins of ethics and morality, speciesism, the use of animals for research and agricultural purposes, transgenic animals. A report on the farm tour or a book review, participation in discussion and a project of the student's choice are used to evaluate the performance of each student.

AN SC 420 Quantitative Animal Genetics
Spring. 2 credits. Prerequisite: AN SC 221 or equivalent. Limited to 30 students. Lec, M 12:20; sec, M 2–4:25. E. J. Pollak.
A consideration of problems involved in improvement of animals through application of the theory of quantitative genetics, with emphasis on genetic evaluation and analysis of data for genetic parameters. Computer labs use interactive matrix algebra programs for problem solving.

AN SC 425 Gamete Physiology and Fertilization
Fall. 2 credits. Limited to 50 students. Prerequisite: AN SC 300 or equivalent. Offered alternate years. Next offered fall 2001, 2003; not offered fall 2002. Lecs, R 2:30–4:25. J. E. Parks.
Study of the formation, growth, differentiation, and maturation of mammalian sperm and oocytes; gamete transport and interaction with male and female reproductive tracts; and cytological, physiological, and molecular changes required for fertilization. Lecture, discussion, and aspects of gamete physiology and *in vitro* technologies such as cryopreservation, oocyte maturation, and fertilization are covered.

AN SC 427 Fundamentals of Endocrinology (also BIOAP 427)
Fall. 3 credits. Prerequisite: animal or human physiology or permission of instructor. Lecs, M W F 9:05. P. A. Johnson.
Physiology and regulation of endocrine secretions. Neuroendocrine, reproductive, growth, and metabolic aspects of endocrinology are emphasized. Examples are selected from many animals, including humans.

AN SC 456 Dairy Management Fellowship
Spring. 2 credits. Limited to seniors. Prerequisites: AN SC 351 and 355, and permission of instructor. S-U grades only. Hours TBA. D. M. Galton and T. Batchelder.
The program is designed for undergraduates who have a sincere interest in dairy farm management. Objective is to gain further understanding of the integration and application of dairy farm management principles and programs with respect to progressive dairying and related industries.

AN SC 494 Special Topics in Animal Science
Fall or spring. 4 credits maximum. Prerequisite: undergraduate standing. S-U grades optional. Staff.
The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the semester begins. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

AN SC 495 Introduction to Research
Fall. 1 credit. S-U grades only. Required of students undertaking Honors in Animal Science. Open to Honors students in other programs and those planning to pursue research, by permission of the instructor. Disc, M 12:20–1:10. W. B. Currie.
An exposure to the world of scientific research including: identifying problems; devising hypotheses and realistic research plans; evaluating scientific writings and other forms of communication; finding and managing reference materials; examining the cost of research and opportunities for funding; discussing the obligations imposed on investigators by society and a host of regulatory agencies, along with responsibilities and freedom in science; and considering ethical issues that affect scientists. Students make oral presentations and prepare brief items of technical writing.

AN SC 496 Internship in Animal Science
Fall or spring. 1–3 credits; limited to 6 credits maximum during undergraduate career. Students must register with an Independent Study form (available in 140 Roberts Hall). S-U grades only. Staff.
Structured, on-the-job learning experience under supervision of qualified professionals in a cooperating organization (e.g., farm, agribusiness, pharmaceutical company, zoo, educational institution). Internships must be approved in advance by the student's academic adviser and must provide an acceptable, professionally supervised experience of at least 60 hours on the job per credit required.

AN SC 497 Individual Study in Animal Science
Fall or spring. 1–3 credits; may be repeated for credit. Intended for students in animal sciences. Prerequisite: permission of instructor. Students must register with an Independent Study form (available in 140 Roberts Hall). S-U grades optional. Staff.
May include individual tutorial study or a lecture topic selected by a professor. Since topics may change, the course may be repeated for credit.

AN SC 498 Undergraduate Teaching
Fall or spring. 1, 2, or 3 credits; limited to 2 experiences during undergraduate career. Limited to students with a GPA of at least 2.7. Students must register with an Independent Study form (available in 140 Roberts Hall).
Designed to consolidate the student's knowledge. A participating student assists in teaching a course allied with the student's education and experience. The student is expected to meet regularly with a discussion or laboratory section, to gain teaching experience, and regularly to discuss teaching objectives, techniques, and subject matter with the professor in charge.

AN SC 499 Undergraduate Research
Fall or spring. 6 credits maximum during undergraduate career. Not open to students who have earned 6 or more undergraduate research credits elsewhere in the college. Limited to juniors and seniors with a GPA of at least 2.7. Students must register with an Independent Study form (available in 140 Roberts Hall).
Affords opportunities for students to carry out independent research under appropriate supervision. Each student is expected to review pertinent literature, prepare a project outline, conduct the research, and prepare a report.

[AN SC 601 Amino Acids (also NS 601)
Spring. 2 credits. Prerequisites: physiology, biochemistry, and nutrition. Lecs, W F 12:20. Offered alternate years. Next offered spring 2003; not offered spring 2002, 2004. R. E. Austic.
A course emphasizing the dynamic aspects of protein digestion and absorption, amino acid transport and amino acid and nitrogen metabolism, and their relationships to the nutritional requirements for amino acids.]

[AN SC 603 Mineral Nutrition: Metabolic, Health, and Environmental Aspects (also NS 603)
Fall. 2 credits. Prerequisites: biochemistry, physiology, and nutrition. Lec T 2:20–4:25. Offered alternate years. Next offered fall 2002; not offered fall 2001, 2003. X. G. Lei and G. F. Combs, Jr.
This course focuses on the metabolic roles and environmental impacts of mineral nutrition in animal, human, and food systems. Team-taught lectures include general biochemical and physiological aspects of mineral metabolism and specific mechanisms of gene expression, regulation, and mammal health disorders associated with individual elements.]

AN SC 604 Vitamins (also NS 604)
Fall. 2 credits. Lec, T R 10:10. G. F. Combs, Jr.
For description, see NS 604.

AN SC 606 Ruminant Nutrition: Microbial Ecology and Forage Chemistry
Spring. 4 credits. Prerequisites: Animal Science 212, Biochemistry. S-U grades optional. Lecs, M W F 9:05; disc, W 8:00. Offered alternate years. Next offered spring 2002, 2004; not offered spring 2003. A. N. Pell.
This course provides an overview of ruminant nutrition with an emphasis on microbial ecology, forage chemistry, and rumen function.

AN SC 610 Animal Science Seminar
Fall and spring. 1 credit. Registration limited to graduate students. S-U grades only. Lec T 12:20–1:10. D. J. Cherney.
Students attend a weekly seminar on topics related to animal science. The requirement for an S grade is to regularly attend seminars during the semester.

AN SC 619 Field of Nutrition Seminar (also NS 619)
Fall and spring. No credit. No grades given.
For description, see NS 619.

AN SC 620 Seminar in Animal Breeding
Fall and spring. 1 credit. Limited to graduate students with a major or minor in animal breeding. S-U grades only. Hours TBA. E. J. Pollak.
Seminar on current topics in animal breeding and statistics as applied to genetic evaluation and selection of domestic animals.

AN SC 621 Seminar: Endo/Reprod Biology
Fall and spring. 1 credit. Prerequisites: permission of instructor. Registration limited to graduate students. S-U grades only. Lec, W 4:00. W. R. Butler and staff.
Current research in reproductive physiology is presented by staff members, graduate students, and visitors.

AN SC 625 Nutritional Toxicology (also TOX 625)
Spring. 2 credits. Prerequisites: biochemistry and nutrition courses. S-U grades optional. Lec, W 1:25–2:15; lab/disc, W 2:30–4:25. D. L. Brown.
Exploration of toxicological principles and a selective survey of natural food and feed toxicants. At the end of this course, students understand relationships between nutrition and toxicology; are prepared to conduct research concerning the effects of naturally occurring toxicants; and are able to use multimedia to present their understanding of a class of toxicants. Occasionally, the class takes walking field trips. In addition, students read printed and electronic communications and create STELLA simulation models and a system of web pages related to a specific family of toxicants.

[AN SC 630 Bioenergetics/Nutritional Physiology
Spring. 3 credits. Prerequisites: AN SC 410 and biochemistry or physiology, or permission of instructor. S-U grades optional. Offered alternate years. Next offered spring 2003; not offered spring 2002, 2004. Lec, M W F 10:10. A. W. Bell and D. E. Bauman.
An integrated systems approach to the nutritional physiology and energy metabolism of productive animals. Emphasis on extracellular regulation of tissue and organ metabolism of specific nutrients in relation to pregnancy, lactation, and growth. Critical discussion of techniques and approaches to the study of animal bioenergetics.]

AN SC 640 Individual Study in Animal Science
Fall or spring. 1 or more credits. S-U grades optional. Hours TBA. Staff.
Study of topics in animal science more advanced than, or different from, other courses. Subject matter depends on interests of students and availability of staff.

AN SC 650 Molecular Techniques for Animal Biologists
Spring. 4 credits. Prerequisites: BIOBM 330 or BIOBM 332 or BIOBM 333 or equivalents and permission of instructors. Enrollment limited to 15 students. Offered alternate years. Next offered spring 2002, 2004; not offered spring 2003. Lec, T 11:15; labs, T and R 1:25–4:25. Y. Boisclair and S. Quirk.
A laboratory course designed for students with little or no experience with techniques in molecular biology. Emphasis is on modern techniques used in conducting research in animal-related sciences such as nutrition, physiology, pharmacology, and immunology (e.g., subcloning, mutagenesis of DNA, RT-PCR, analysis of gene expression, protein expression). Lectures introduce laboratory exercises and supplement laboratory topics. Students perform an independent project requiring time outside scheduled laboratories and give a scientific presentation.

AN SC 694 Special Topics in Animal Science
Fall or spring. 4 credits maximum. Prerequisite: graduate standing. S-U grades optional.
The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the semester begins. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

AN SC 720 Advanced Quantitative Genetics
Spring. 3 credits. Prerequisites: matrix algebra, linear models, and mathematical statistics. S-U grades optional. Offered alternate years. Next offered spring 2002, 2004; not offered spring 2003. Hours TBA. R. L. Quaas.
This course covers statistical methods used in a variety of problems in the quantitative genetics of animal populations. The initial focus is the estimation of breeding values for purposes of ranking animals for selection. The core of the course is the mixed linear model; linear estimators and predictors are treated extensively. The importance of appropriate modeling is emphasized. Generalizations to nonlinear models, via Bayesian principles, are made, i.e., inferences from posterior distributions.

AN SC 800 Master's-Level Thesis Research
Fall or spring. Credit TBA, maximum 12 credits/semester. Prerequisite: permission of adviser. S-U grades only. Graduate faculty.
For students admitted specifically to a Master's program.

AN SC 900 Graduate-Level Thesis Research
Fall or spring. Credit TBA, maximum 12 credits/semester. Prerequisite: permission of adviser. S-U grades only. Graduate faculty.
For students in a Ph.D. program **only before** the "A" exam has been passed.

AN SC 901 Doctoral-Level Thesis Research
Fall or spring. Credit to be arranged, maximum 12 credits/semester. Prerequisite: permission of adviser. S-U grades only. Graduate faculty.

For students admitted to candidacy **after** the "A" exam has been passed.

Related Courses in Other Departments

Introductory Animal Physiology (BIOAP 311)

Introductory Animal Physiology Laboratory (BIOAP 319)

Milk Quality (FOOD 351)

Agriculture in the Developing Nations (INTAG 602)

Lipids (NS 602)

Basic Immunology, Lectures (BIOG 305)

BIOLOGICAL SCIENCES

The program of study in biology is coordinated by the Office of Undergraduate Biology. For course descriptions, see the section on Biological Sciences.

BIOLOGY & SOCIETY

The undergraduate major field of study in biology and society is offered through the Department of Science and Technology Studies. For a full description of courses that fulfill field requirements, see the Biology and Society listing under 'Special Programs and Interdisciplinary Studies' in this publication.

BIOMETRY AND STATISTICS

M. Wells, chair, N. S. Altman, C. Castillo-Chavez, M. Contreras, D. Hiebeler, F. Hu, R. Lloyd, R. Nielsen, S. J. Schwager, R. Strawderman

The Department of Biometrics in Statistical Science offers the following courses in Biometry and Statistics. Students need to register under Course Listings: College of Agriculture and Life Sciences—Biometry and Statistics.

BTRY 100 Statistics and the World We Live In (also STBTRY 100)
Fall. 3 credits. Lecs, M W F 11:15–12:05; sec, M or T 1:25–2:15 or 2:30–3:20. S. J. Schwager.
Major concepts and approaches of statistics are presented at an introductory level. Three broad areas are covered: collecting data, organizing data, and drawing conclusions from data. Topics include: sampling, statistical experimentation and design, measurement, tables, graphs, measures of center and spread, probability, the normal curve, confidence intervals, and statistical tests.

BTRY 101 Introduction to Biometry I
Spring. 4 credits. S-U grades optional. Prerequisites: pre-calculus. Lecs, M W F 11:15–12:05; lab, R or F 8:00–9:55 or 2:30–4:25. D. Hiebeler.
An introductory survey course in the use of mathematics, computing, and probability and statistics in the biological sciences. Case studies are used to develop the ideas of statistics, curve fitting, elementary matrix algebra, basic probability, and differentiation. Selected topics in differential and difference equations and integration are also covered. A symbolic mathematics and graphics package (e.g., Maple or Mathematica) is taught and used throughout the course.

BTRY 102 Introduction to Biometry II
Fall. 4 credits. S-U grades optional. Prerequisite: BTRY 101 or 2 semesters of calculus. Lecs, M W F 11:15–12:05; lab, T 12:20–2:15 or 2:30–4:25. D. Hiebeler.
This course is the continuation of Biometry 101. It provides a more in-depth view of the use of mathematics, computing, and probability and statistics in the biological sciences. Topics covered include: discrete and continuous models, applications of differential and integral calculus, optimization methods, matrix algebra, and Markov models.

BTRY 261 Statistical Methods I (also STBTRY 261)
Fall and summer. 4 credits. Lecs, M W F 12:20–1:10; sec, M or T 1:25–2:15 or 2:30–3:20. R. Lloyd.
Statistical methods are developed and used to analyze data arising from a wide variety of applications. Topics include descriptive statistics, point and interval estimation, hypothesis testing, inference for a single population, comparisons between two populations, one and two-way analysis of variance, analysis of categorical data, and correlation and regression analysis. Interactive computing is introduced through MINITAB statistical software. Emphasis is on basic principles and criteria for selection of statistical techniques. The lectures may co-meet with BTRY 601. Sections, homeworks, and exams are administered separately.

BTRY 302 Statistical Methods II (also STBTRY 302)
Spring. 4 credits. Prerequisite: BTRY 261 or BTRY 601. Limited to undergraduates. Lecs, M W F 11:15–12:05; sec, M 2:30–4:25. R. Lloyd.
A continuation of BTRY 261. Emphasis is on the use of multiple regression analysis, analysis of variance and related techniques to analyze data in a variety of situations. Topics include: least squares estimation; multiple regression; model selection techniques; detection of influential points; goodness-of-fit criteria; principles of experimental design; analysis of variance for a number of designs including multiway factorial, nested, and split plot designs; comparing two or more regression lines; and analysis of covariance. Emphasis is on the appropriate design of studies prior to data collection and the appropriate application and interpretation of statistical techniques. For practical applications, computing is done using the SAS statistical package. The lectures co-meet with BTRY 602. Homeworks and exams are administered separately.

BTRY 400 Biometry Seminar (also STBTRY 400)
Fall and spring. 1 credit. S-U grades only. Prerequisite: BTRY 302, or 409, or 602, or permission of instructor. Sem, R 3:35–4:25. S. J. Schwager.
Students attend a weekly seminar, the Biometrics Unit Discussion Series. Can be taken concurrently with BTRY 600 only with permission of instructor. Students can only take this course twice.

BTRY 408 Theory of Probability (also STBTRY 408)
Fall. 4 credits. Prerequisite: MATH 112, 122, or 192, or permission of instructor. Lecs, M W F 10:10–11:00; sec, M 3:35–5:00. R. Strawderman.
An introduction to probability theory: foundations, combinatorics, random variables and their probability distributions, expectations, generating functions, and limit theory. Biological and statistical applications are the focus. Can serve as either a one-semester introduction to probability or a foundation for a course in the theory of statistics.

BTRY 409 Theory of Statistics (also STBTRY 409)
Spring. 4 credits. Prerequisite: BTRY 408 or equivalent. Lecs, M W F 10:10–11:00; sec, M 3:35–5:00. R. Strawderman.
The concepts developed in BTRY 408 are applied to provide an introduction to the classical theory of parametric statistical inference. Topics include sampling distributions, parameter estimation, hypothesis testing, and linear regression.

BTRY 421 Matrix Computation
Spring. 4 credits. Prerequisite: pre-calculus. Lecs, M W F 9:05–9:55; sec, R 9:05–9:55. M. Contreras.
Introductory course in matrix computations that reviews linear algebra (vector spaces, linear independence) and emphasizes a matrix approach to solving systems (LU-factorization, QR-decomposition, SVD, Schur complements) and the role of the condition number of a matrix. Positive definite matrices, eigenvalues, and their applications in modeling are discussed. Weekly homework assignments and a course project design to teach numerical and statistical simulations in Matlab using the theory of matrices are required.

BTRY 494 Undergraduate Special Topics in Biometry and Statistics (also STBTRY 494)
Fall or spring. 1–3 credits. S-U grades optional.
A course of lectures selected by the faculty. Because topics usually change from year to year, this course may be repeated for credit.

BTRY 495 Statistical Consulting (also STBTRY 495)
Spring. 2 credits. S-U grades only. Limited to undergraduates. Prerequisites or co-requisites: BTRY 302 or 602 and 409 and permission of instructor. Lec, W 1:25–2:15. S. J. Schwager.
Participation in the Department of Biometrics consulting service: faculty-supervised statistical consulting with researchers from other disciplines. Discussion sessions for joint consideration of selected consultations encountered during previous weeks.

BTRY 497 Undergraduate Individual Study in Biometry and Statistics (also STBTRY 497)
Fall and spring 1–3 credits. S-U grades optional. Students must register with an Independent Study form (available in 140 Roberts Hall).
Consists of individual tutorial study selected by the faculty. Because topics usually change from year to year, this course may be repeated for credit.

BTRY 498 Undergraduate Supervised Teaching (also STBTRY 498)
Fall and spring. 2 credits. S-U grades optional. Students must register with an Independent Study form (available in 140 Roberts Hall).
Students assist in teaching a course appropriate to their previous training. Students meet with a discussion or laboratory section and regularly discuss objectives with the course instructor.

BTRY 499 Undergraduate Research (also STBTRY 499)
Fall or spring. 1–3 credits. S-U grades optional. Limited to statistics and biometry undergraduates. Prerequisite: permission of faculty member directing research. Students must register with an Independent Study form (available in 140 Roberts Hall).

BTRY 600 Statistics Seminar (also STBTRY 600)
Fall and spring. 1 credit. S-U grades only. Prerequisite or corequisite: BTRY 409 or permission of instructor. Sem 3:35–4:25. M. Wells.

BTRY 601 Statistical Methods I (also STBTRY 601)
Fall and summer. 4 credits. Limited to graduate students; others by permission of the instructor. Lecs, M W F 12:20–1:10; sec, M or T 2:30–4:00 or 7:30–9:00 P.M. or T 10:10–11:40. R. Lloyd.
Statistical methods are developed and used to analyze data arising from a wide variety of applications. Topics include descriptive statistics, point and interval estimation, hypothesis testing, inference for a single population, comparisons between two populations, one- and two-way analysis of variance, comparisons among population means, analysis of categorical data, and correlation and regression analysis. Interactive computing is introduced through MINITAB statistical software. Emphasis is on basic principles and criteria for selection of statistical techniques.

BTRY 602 Statistical Methods II (also STBTRY 602)
Spring. 4 credits. Limited to graduate students; others by permission of instructor. Prerequisite: BTRY 601 or equivalent. Lecs, M W F 11:15–12:05; sec, M 2:20–4:25 or 7:30–9:25 P.M. or T 12:20–2:15. R. Lloyd.
A continuation of BTRY 601. Emphasis is on the use of multiple regression analysis, analysis of variance, and related techniques to analyze data in a variety of situations. Topics include an introduction to data collection techniques; least squares estimation; multiple regression; model selection techniques; detection of influential points, goodness-of-fit criteria; principles of experimental design; analysis of variance for a number of designs, including multi-way factorial, nested, and split plot designs; comparing two or more regression lines; and analysis of covariance. Emphasis is on appropriate design of studies prior to data collection, and the appropriate application and interpretation of statistical techniques. For practical applications, computing is done with the MINITAB and SAS statistical packages.

[BTRY 603 Statistical Methods III (also STBTRY 603)
Spring. 3 credits. Prerequisite: BTRY 601 and 602 or permission of instructor. Offered alternate years. Next offered spring 2003. Lecs T R 8:40–9:55.
Categorical data analysis, including logistic regression, loglinear models, stratified tables, matched pairs analysis, polytomous response and ordinal data. Applications in biomedical and social sciences.]

BTRY 604 Statistical Methods IV: Applied Design (also STBTRY 604)
Spring. 3 credits. Prerequisites: BTRY 601 and 602 or permission of instructor. Offered alternate years. Not offered spring 2003. Lecs T R 8:40–9:55. F. Hu.
Applications of experimental design including such advanced designs as split plots, incomplete blocks, fractional factorials. Use of the computer for both design and analysis is stressed, with emphasis on solutions of real data problems.

[BTRY 652 Computationally Intensive Statistical Inference (also STBTRY 652)
Spring. 4 credits. S-U grades optional. Prerequisite: BTRY 421 and BTRY 409 or equivalent. Offered alternate years. Not offered spring 2002. Lecs, M W F 2:30–3:20. N. S. Altman.
Modern applications in statistics often require intensive computation not handled by "off-the-shelf" software. This course covers topics in statistical computing including numerical optimization and finding zeros (likelihood and related techniques including generalized estimating equations and robust estimation), kernel density estimation, resampling methods (randomization and bootstrap tests and confidence intervals), and statistical simulation (random number generation, heuristic search methods, Bayesian estimation and Monte Carlo Markov Chain methods for tests and interval estimation). Programming will be done in Matlab. The focus of the course is on the use of numerical analysis methods for solving problems in statistical inference and estimation.]

BTRY 662 Mathematical Ecology (also STBTRY 662)
Fall. 3 credits. S-U grades optional. Prerequisites: a year of calculus and a course in statistics. Lecs, T R 1:25–2:40. C. Castillo-Chavez.
Mathematical and statistical analysis of populations and communities: theory and methods. Spatial and temporal pattern analysis, deterministic and stochastic models of population dynamics. Model formulation, parameter estimation, and simulation and analytical techniques.

[BTRY 672 Topics in Environmental Statistics (also STBTRY 672)
Fall and spring. 2 credits. S-U grades optional. Prerequisite: BTRY 601 or permission of the instructor. Not offered 2001–2002. Lec, R 10:10–11:25. N. S. Altman.
This course is a discussion group focusing on statistical problems arising in the environmental sciences. These issues are explored in a number of different ways, such as student presentations of research papers, directed readings, and outside speakers.]

BTRY 682 Statistical Genomics (also STBTRY 682)
Spring. 4 credits. S-U grades optional. Prerequisite: BTRY 408, BTRY 409, and BIOGD 281, or equivalent or permission of the instructor. Lecs, T R 11:40–12:55; sec, F 12:20–1:10. R. Nielsen.
This course covers topics in the statistical analysis of genetic, molecular and genomic data, including the statistics of DNA database searches and alignment, statistical methods in molecular evolution, population genetics, phylogenetics, molecular ecology, forensic genetics, the analysis of comparative molecular data, QTL mapping, and association mapping. Topics may vary from year to year. All students are expected to participate in small research projects.

BTRY 694 Graduate Special Topics in Biometry and Statistics (also STBTRY 694)
Fall or spring. 1–3 credits. S-U grades optional. A course of lectures selected by the faculty. Because topics usually change from year to year, this course may be repeated for credit.

BTRY 697 Individual Graduate Study in Biometry and Statistics (also STBTRY 697)
Fall, spring, or summer. 1–3 credits. S-U grades optional.
Consists of individual tutorial study selected by the faculty. Because topics usually change from year to year, this course may be repeated for credit.

[BTRY 717 Linear and Generalized Linear Models (also STBTRY 717)
Spring. 3 credits. S-U grades optional. Prerequisites: BTRY 409, BTRY 417, and 602 or equivalents. Offered alternate years. Not offered 2001–2002.
Statistical modeling and inference using linear models and generalized linear models. Estimation by least squares, maximum likelihood, quasi-likelihood, and generalized estimating equations. Covers the use of link functions and generalized linear models to accommodate nonlinear models and non-normally distributed data. Also covers the use of random effects to accommodate correlation structures in both linear mixed models and generalized linear mixed models and to model longitudinal data. Some use of software packages and illustrative examples.]

BTRY 795 Statistical Consulting (also STBTRY 795)
Spring. 2 credits. S-U grades only. Limited to graduate students. Prerequisite or corequisite: BTRY 602 and BTRY 409 or equivalent. Lec, W 1:25–2:15. S. J. Schwager.
Participation in the Department of Biometrics consulting service: faculty supervised statistical consulting with researchers from other disciplines. Discussion sessions for joint consideration of selected consultations encountered by the services during previous weeks. Since consultations usually change from semester to semester, the course may be repeated for credit.

BTRY 798 Graduate Supervised Teaching (also STBTRY 798)
Fall and spring. 2–4 credits. S-U only. Permission of instructor and chair of special committee plus at least 2 advanced courses in statistics and biometry.
Students assist in teaching a course appropriate to their previous training. Students meet

with a discussion section, prepare course materials, and assist in grading. Credit hours are determined in consultation with the instructor, depending on the level of teaching and the quality of work expected.

BTRY 800 Master's-Level Thesis Research
Fall or spring. Credit TBA. S-U grades only. Limited to candidates for graduate degrees. Prerequisite: permission of the graduate field member concerned.
Research at the M.S. level.

BTRY 900 Graduate-Level Dissertation Research
Fall or spring. Credit TBA. S-U grades only. Limited to candidates for graduate degrees. Prerequisite: permission of the graduate field member concerned.
Research at the Ph.D. level.

BTRY 901 Doctoral-Level Dissertation Research
Fall or spring. Credit TBA. S-U grades only.

COMMUNICATION

R. E. Ostman, chair; K. Berggren, M. Campo, A. P. Chan, R. D. Colle, B. O. Earle, G. Gay, D. A. Grossman, J. Hayman, D. Krikorian, B. Lewenstein, T. M. Russo, C. Scherer, D. Scheufele, J. Shanahan, M. A. Shapiro, R. B. Thompson, L. VanBuskirk, W. B. Ward

Note: class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

COMM 116 Communication in Social Relationships
Spring or summer. 3 credits. Spring: lecs, M W F 1:25–2:15. Staff.
An overview of current knowledge about communication, with particular emphasis on interpersonal communication. Introduction to a wide range of contemporary theories and research about effective communication in contexts such as friendships, small groups, organizations, and health care settings.

COMM 117 Writing about Communication
Spring. 3 credits. Concurrent enrollment in COMM 116 required. T R 10:10–11:25, 11:40–12:55, 1:25–2:40. L. VanBuskirk and staff.
Students develop skill in various writing styles and genres. The class explores communication practices and theories as they are observed and studied in personal and professional contexts. Assignments polish students' ability to gather information, to analyze information, to integrate ideas about communication, and to express those ideas clearly and cogently.

COMM 120 Contemporary Mass Communication
Fall or summer. Lecs, M W F 12:20–1:10. J. Shanahan.
The processes and effects of communication systems. Topics include the evolution of communication media, current knowledge about mediated communication, and the role of communication in contemporary social issues. Discussion sections relate the course topics to students' personal experience. Assignments include case studies, experiential learning exercises, and short papers.

COMM 121 Investigating Communication
Fall. 1 credit. Communication majors only. Students must be enrolled concurrently in COMM 120. Lecs, T 10:10–11:00. J. Shanahan.
An examination of research methods in communication, with particular emphasis on the mass communication process. Lectures and exercises are linked to lectures from COMM 120, providing an introduction to how research about communication is done. This course is required for communication majors.

COMM 191 Topics In Communication
Summer. 1–3 credits. Hours TBA. Staff.
Study of topics in communication at lower-division level. Special emphasis is on topics reflecting the expertise of visiting faculty available in summer session and on topics suitable for entry-level college students.

COMM 201 Oral Communication
Fall, spring, or summer. 3 credits. Each section limited to 20 students (fall and spring) or 15 students (summer). Preference given to sophomores, juniors, and seniors. Fluency in spoken English is assumed. Students missing the first two class meetings without university excuse are dropped so others may register. No student will be added or dropped after the second week of classes. K. Berggren, J. Hayman, T. Russo, R. Thompson, and staff.
Through theory and practice students develop self-confidence and competence in researching, organizing, and presenting material to audiences. Students give four graded speeches, write short papers, perform speaker evaluations, and engage in other speech-related activities.

COMM 203 Argumentation and Debate
Fall or summer. 3 credits. T R 10:10–11:25. J. Hayman.
Students learn the principles of argumentation and debate. Topics emphasize Internet database research, synthesis of collected data, analysis of evidentiary quality, refutation of counter claims, identification of logical fallacies, risk evaluation, framing of issues, and coherent storytelling. Students are prepared to work with a great range of opinion and evidence. The course emphasizes different viewpoints, including those of different cultures. Assumptions are questioned and interrogated.

[COMM 204 Effective Listening
Fall, spring, or summer. 3 credits. Limited to 25 nonfreshman students per section. No students accepted or allowed to drop after the second week of classes. Lec, M 2:55–4:10; sec, W 1:25–2:40, 2:55–4:10; R 1:25–2:40, 2:55–4:10. Not offered 2001–2002. R. Thompson.
Lecture and sections are used to present an analysis of the process of listening, to identify barriers to effective listening, and to develop students' listening skills. Topics include audiology, cultural contexts, intercultural communication, linguistics, therapeutic listening, and critical analysis of information. Students are involved in skill-building exercises and in writing self-analytical papers, as well as attending seminars.]

COMM 230 Visual Communication
Spring. 3 credits. Lec 01, T R 9:05–9:55; lab, T 2:30–4:25; W 10:10–12:05, 12:20–2:15 or 2:30–4:25. C. Scherer.
An introduction to visual communication theory. The course examines how visuals influence our attention, perspectives, and understanding. Examples of visuals drawn from advertising, TV news, documentaries, entertainment movies, print and interactive media are used to develop a theoretical framework for becoming more visually aware and for thinking more critically about how visuals influence us.

COMM 240 Communication Systems and Technologies
Spring. 3 credits. Lec M W 2:55–4:10. A. P. Chan.
An exploration of the nature of communication systems and technologies. Topics include a brief history of communication and information technologies, descriptions of the uses, and impacts of technologies within the social system, and an introduction to electronic message design and construction.

[COMM 250 Newswriting for Newspapers
Fall. 3 credits. Limited to 25 students. Keyboarding ability essential. Students missing first two classes without university excuse will be dropped. Prerequisite: college-level writing course. Lecs, M W 9:05–9:55; labs, R 2:30–4:25 or F 9:05–11:00. Not offered 2001–2002. Staff.
Writing and analyzing news stories. A study of the elements that make news, sources of news, interviewing, writing style and structure, press problems, and press-society relations. Concentration on newswriting as it is practiced by newspapers in the United States. Two writing assignments each week, one done in class, one done out of class.]

COMM 260 Science Writing for Public Information
Fall, spring, or summer. 3 credits. Limited to 25 nonfreshman or graduate students per section. Prerequisite: one college-level writing course. Fall: Lec 01, M W F 9:05–9:55, Lec 02, M W F 10:10–11:00; spring: Lec 01, M W F 9:05–9:55 or Lec 02, M W F 1:25–2:15. Staff.
An intensive course in simplifying scientific and technical material for specific audiences within the general public. Weekly assignments include instructions, descriptions, explanations, and summaries in such formats as the newsletter, brochure, and report. Audience analysis is emphasized. Not oriented to the mass media.

COMM 263 Organizational Writing
Fall, spring, or summer. 3 credits. Limited to 25 junior, senior, or graduate students per section. Prerequisite: any college-level writing course. Lec 01, M W F 10:10–11:00, Lec 02, M W F 11:15–12:05. L. VanBuskirk and staff.
Students write from the point of view of various organizations, including businesses, government agencies, and non-profit organizations. Emphasis is on appropriate representation of the writer's organization, audience analysis, and clear and effective written presentation of detailed content. Assignments include text for web sites, reports, proposals, memoranda, letters, and e-mail.

COMM 272 Principles of Public Relations and Advertising
Summer. 3 credits. Not open to freshmen. Staff.
Survey of the fields of public relations and advertising. Descriptions of organizations, jobs, and functions in the industry. The roles of public relations and advertising in society,

the economic system, and organizations. Psychological and sociological principles as bases for appeals. Strategies for media selection and message execution. Introduction to research and regulation.

COMM 282 Communication Industry Research

Fall. 3 credits. Prerequisite: COMM 116, 120, 121. Lec, M W F 12:20–1:10. D. Scheufele.

Public opinion polls, readership/viewership studies, audience segmentation techniques, and media and message effect evaluation are all widely used in communication industries. This course covers the use of basic research design, measurement, sampling, and simple descriptive statistics in conducting these studies.

COMM 284 Sex, Gender, and Communication

Fall. 3 credits. Not open to freshmen. T R 2:55–4:10. L. VanBuskirk.

The course explores the personal, career, social, and economic implications of gender categories. Topics considered include theories of gender construction, social structures, personal relationships, and gender concerns in the workplace.

COMM 285 Communication in Life Sciences (also S&TS 285)

Spring. 3 credits. M W F 10:10–11:05. Staff.

Environmental problems, public health issues, scientific research—in each of these areas, communication plays a fundamental role. From the mass media to individual conversations, from technical journals to textbooks, from lab notes to the web, communication helps define social issues and research findings. This course examines the institutional and intellectual contexts, processes, and practical constraints on communication in the life sciences.

COMM 301 Business and Professional Speaking

Fall, spring, or summer. 3 credits. Prerequisite: COMM 201. Limited to second term sophomores, juniors, and seniors during fall and spring. Lec, M W 11:15–12:05; sec, T 2:30–4:25; W 1:25–3:20; R 10:10–12:05. B. Earle.

The study and practice of written and oral communication skills used in formal and informal organizations, including interviews, informative and persuasive speeches, reports, and discussions. Students exercise and enhance the organizational, analytical, and presentational skills needed in particular settings suited to their own business and professional careers.

COMM 303 Speech and Debate Practicum

Fall and spring. 2 credits. Limited to 10–15 Program in Speech and Debate members only; permission of instructor and completion of 1-year trial basis. Hours TBA. J. Hayman.

Students learn preparation for practice in CEDA (Cross Examination Debate Association) debate, Lincoln Douglas debate, or individual speaking events. The class is divided into four groups according to level of experience; therefore it may be repeated to a maximum of eight credits.

COMM 330 Communication Technologies and Management of Information

Fall. 3 credits. Prerequisite: COMM 240. T R 10:10–11:25. Staff.

Appropriate use of communication and information technologies can facilitate the coordination, control, and management of information. This course surveys existing theories and practice of information management, integrating insights cutting across communication, economics, management science, and sociology.

COMM 350 Writing for Magazines

Fall, spring, or summer. 3 credits. Prerequisite: any college-level writing course. Limited to 25 juniors, seniors, and graduate students, or others with permission of instructor. No drops after third week. Extensive out-of-class writing assignments. Fall: M 1:25–4:25. W. Ward; spring: lec, T R 8:40–9:55; lab, R 1:25–2:15. Staff.

A course in nonfiction freelance writing for magazines. Intensive fact writing to help students communicate more effectively through the medium of the printed word in magazines. Art and techniques of good writing are studied; magazines in many fields of interest are reviewed. All articles are analyzed and returned to the student to rewrite and submit to a magazine.

COMM 352 Science Writing for the Mass Media (also S&TS 352)

Fall. 3 credits. Not open to freshmen. Limited to 24 students. Prerequisite: 1 college-level writing course. Lecs, M W 9:05; lab, W 12:20–2:15. Staff.

How to write about science, technology, and medicine for the mass media. Discussion topics include accuracy, simplicity, comprehensiveness, risk communication, and the history and social structure of science. Writing assignments focus on writing news and feature stories for newspapers and magazines, with excursions into newsletters, radio, TV, and other media.

[COMM 353 Science Writing Practicum

Spring. 1 credit. Prerequisite: COMM 260, COMM/S&TS 352, ENG. 350 or permission of instructor. Hours TBA. Offered even-numbered years. Not offered 2001–2002. B. Lewenstein.

Students cover the annual meeting of the American Association for the Advancement of Science, held in February each year. Before the meeting, students review science writing techniques and issues. At the meeting, students meet with science writers and attend press conferences and scientific sessions. Students write at least two stories. Students are responsible for all costs of travel, lodging, and meals.]

[COMM 368 Text Editing and Management

Fall. 3 credits. Limited to 25 junior, senior, or graduate students. Prerequisite: COMM 250, 260, 263, 350 or 352. M W F 12:20–1:10. Not offered 2001–2002. Staff.

How to guide a manuscript from draft to presentation. Topics include production, copy editing and design, document management, and editorial decision making. Publications include books, magazines, newsletters, and promotional and educational materials for internal and external use. Appropriate for those who will oversee publications as part of their work.]

COMM 376 Planning Communication Campaigns

Spring. 3 credits. Prerequisites: COMM 282 or equivalent social research course (may be taken concurrently). M W F 9:05–9:55. D. Scheufele.

Overviews theories that guide and influence social change efforts. Research techniques and communication tools used in communication planning and campaign design are reviewed. Class discussion focuses on social change efforts in nutrition and health, rural development, marketing, and the environment. Students work closely with a client in designing a communication campaign.

COMM 380 Independent Honors Research in Social Science

Fall or spring. 1–6 credits. Limited to undergraduates who have met the requirements for the honors program. R. Ostman.

COMM 398 Issues in Teaching Communication

Fall and spring. 1 credit. Prerequisite: must be past or current undergraduate teaching assistant for COMM 201, 204, or 301. Alternate M 7:30–9:10 P.M. K. Berggren.

This seminar brings together novice educators to discuss ideas, experiences, and practice. Integration of theory into actual education efforts is challenging for professional educators. Novice teachers are not aware of their common experiences, much less of a theoretical component to education. In discussions of actual teaching experiences, literature reviews, research reports, textbook chapters, curriculum, and evaluation tools, students examine new ideas and practices. The primary goal of the seminar is to enrich and deepen the novice teaching experience.

COMM 405 Community Service Practicum

Fall and spring. 2 credits. May be repeated for credit. Limited to 10–15 Program in Speech and Debate members; permission of instructor required. Hours TBA. J. Hayman.

Students share their communication talents in structured experiences in which they design and implement a speech or debate project in local schools or the community.

COMM 410 Organizational Behavior and Communication

Fall. 3 credits. Labs limited to 15 junior, senior, or graduate students. Prerequisite: COMM 116 or equivalent. Lec, M W 10:10–11:00; Sec 01, W 2:30–4:25; Sec 02, F 10:10–12:05; Sec 03, F 10:10–12:05; Sec 04, F 12:20–2:15; Sec 05, F 12:20–2:15. D. Krikorian.

Study of management and leadership in formal organizations with emphasis on the psychology of communication between supervisor and employee; examination of formal and informal communication networks, and interpersonal communication in an organizational context. Case studies are analyzed in lab.

[COMM 411 Leadership from a Communication Perspective

Spring. 3 credits. Limited to 30 students. Lec, T R 1:25–2:40. Not offered 2001–2002. Staff.

Leadership is a product of human communication. Leadership competence can be increased by increasing communication competence. Leadership theories, particularly transformational leadership, are studied, and gender/minority responsive leadership is stressed. Practical application includes leadership exercises and observation of leaders.]

[COMM 412 Communication Leadership Lab

Spring. 1 credit. Concurrent enrollment in COMM 411 required. Hours TBA. Not offered 2001–2002. Staff.

This course provides laboratory experience in leadership and the methods used to analyze leadership in an organization. Students take turns serving as a group leader of six to eight students in applying leadership theories to study leadership styles, leader-follower relations, organizational culture, and leadership competencies in an organization.]

COMM 418 Communication and Persuasion

Spring. 3 credits. Limited to juniors and seniors only. Prerequisite: COMM 282 or equivalent social science research methods course; and COMM 116 and 120 or introductory psychology or social psychology. T R 10:10–11:40. M. Campo.

The course focuses on theories of communication's influence on persuasion and attitude change. Students become familiar with a variety of social-psychological theories of attitude change and persuasion. Those theories are also applied to a variety of communication situations including mass communication, advertising, public relations/public information, and interpersonal communication. Lectures concurrent with COMM 618; graduate students should enroll in COMM 618.

COMM 420 Public Opinion and Social Processes

Fall. 3 credits. Limited to juniors and seniors only. Prerequisite: COMM 282 or equivalent social science research methods course. Lec, T R 10:10–11:25. M. Campo.

The course provides an overview of the theoretical and applied literature related to the concept, "public opinion." Students investigate how public opinion is perceived and acted upon by society. Relationships between public opinion, communication, and social psychological variables are examined. Public opinion is studied using current theoretical and practical applications. Analysis and interpretation of public opinion polls and trends in public opinion on specific issues. Lectures concurrent with COMM 620; graduate students should enroll in COMM 620.

[COMM 421 Communication and the Environment

Spring. 3 credits. Lec, T R 11:40–12:55. Offered even-numbered years. Not offered 2001–2002. J. Shanahan.

Students investigate how values, attitudes, social structure, and communication affect public perceptions of environmental risk and public opinion about the environment. A primary focus is mass media's impact in public perceptions of the environment, how the media portray the environment, and discussion of the implications of public consumption of environmental content.]

COMM 422 Psychology of Television (and Beyond)

Fall. 3 credits. Prerequisites: introductory psychology or COMM 120. M W F 12:20–1:10 (one evening mid-semester prelim). M. Shapiro.

A survey of knowledge about the psychological influence of television and other audio-visual communication technologies. Topics may include: the history of concerns about television and movies, who watches television and why, how people understand and mentally process television, how television influences thinking and emotions, the effects of various forms (including entertainment, news, and advertising), the future forms of mass media including multimedia and virtual reality. Lectures concurrent with COMM 622; graduate students should enroll in COMM 622.

COMM 424 Communication in the Developing Nations

Fall. 3 credits. Limited to juniors and seniors. Lec, T 1:25–2:35; lab, T 2:35–4:25. R. Colle.

The role of communication in development programs, particularly in the Third World. Emphasis is on communication interventions in agriculture, health, nutrition, family planning and community development, and especially on methods for designing communication strategies for reaching low-income, rural people. Among the approaches considered are extension, social marketing, and development support communication. Lectures concurrent with COMM 624; graduate students should enroll in COMM 624.

COMM 426 Impact of Communication Technologies

Spring. 3 credits. M W 2:55–4:10. Staff.

Examine emerging technologies of communication, such as computer-based information systems and satellites and their potential for influencing communication processes and social systems. Also examines the impacts of previous communication innovations from cave painting to television. Meets with COMM 626; graduate students should enroll in COMM 626.

COMM 428 Communication Law

Spring. 3 credits. Offered even-numbered years. Limited to junior, senior, and graduate students; others by permission of the instructor. Lec, M W F 11:15–12:05. D. Grossman.

A practical survey of the law governing mass media, primarily for those working in the field. Coverage includes restraints on news gathering and publication, privacy, defamation, copyright, broadcast and cable regulation, access, electronic media, and other issues of current interest.

COMM 429 Legal Issues in Business and Electronic Communication

Spring. 3 credits. Prerequisite: COMM 428. Offered odd-numbered years. M W F 11:15–12:05. D. Grossman.

The increase in commercial use of the Internet and new types of interactive electronic media in business create unique contexts for applying traditional principles of law. This course examines the rights and responsibilities of parties involved in electronic commerce, including information security (guaranteeing confidentiality and effective record-keeping), electronic contracts and EDI, rights in information (copyrights, trade secrets, trademarks, and patents), regulation of information content (pornography and advertising), and regulation of on-line conduct (criminal liability and civil exposure).

COMM 439 Designing for Human Computer Interaction

Fall. 3 credits. Prerequisite: permission of instructor. Lec, T 11:40–12:55; lab 01, T 1:25–2:15, lab 02, R 1:25–2:15. G. Gay.

This course is concerned with key issues of the design of the interaction between computers and people. Students come away from the course with an ability to evaluate solutions to design problems and a familiarity with implementing HCI designs. Lectures concurrent with COMM 639; grad students should enroll in COMM 639.

COMM 440 Computer Mediated Communication: Theory and Practice

Spring. 3 credits. Permission of instructor. Letter grade only. Lec, T 12:20–2:15; lab 01, T 11:15–12:05; lab 02, R 11:15–12:05. G. Gay.

Course focuses on the design of computer interfaces and software from the user's point of view. The goal is to teach user interface designs that "serve human needs" while building feelings of competence, confidence, and satisfaction. Topics include formal models of people and interactions, collaborative design issues, psychological and philosophical design considerations, and cultural and social issues. Lectures concurrent with COMM 640; graduate students should enroll in COMM 640.

COMM 466 Public Communication of Science and Technology (also S&TS 466)

Fall. 3 credits. Limited to 15 students. Prerequisite: COMM 352 or 360, or Engineering 350, or permission of instructor. Offered even numbered years. M W 2:55–4:10. B. Lewenstein.

Explore the structure, meanings, and implications of "public communication of science and technology" (PCST). Examine the contexts in which PCST occurs, look at motivations and constraints of those involved in producing information about science for nonprofessional audiences, analyze the functions of PCST. Tie existing ideas about PCST to general communication research, and learn how to develop new knowledge about PCST. Course format is primarily seminar/discussion.

COMM 476 Communication Fellows Program

Spring. 2 credits. M 2:55–4:10. Prerequisites: permission of instructor; limited to communication seniors selected based on goals and academic preparation. B. O. Earle.

A series of lectures, seminars and guest speakers exploring the planning, evaluation and policy-making process. Includes a three-day trip to a metropolitan area to visit corporate leaders, administrative agencies, and policymakers. Fee of $150.00 charged.

COMM 486 Risk Communication

Spring. 3 credits. T R 1:25–2:15; lab R 2:30–4:25. C. Scherer.

An examination of theory and research related to the communication of scientific information about environmental, agricultural, food, health, and nutritional risks. Course concentrates on social theories related to risk perception and behavior. Case studies involving pesticide residues, waste management, water quality, environmental hazards, and personal health behaviors are examined. Emphasis is placed on understanding, applying, and developing theories of risk communication. Lectures concurrent with COMM 686; graduate students should enroll in COMM 686.

COMM 494 Special Topics in Communication

Fall, spring, or summer. 1–3 credits variable. S-U grades optional. Prerequisite: permission of instructor.

Study of topics in communication not otherwise provided by a department course and determined by the interest of the faculty and students.

COMM 496 Internship

Fall, spring, summer, and intersession. 1–3 credits. Students must apply no later than the spring pre-course enrollment period for a fall internship or the fall pre-course enrollment period for a spring or summer internship. **Prerequisites: limited to communication juniors or seniors, 3.0 average in communication courses, and approval of academic adviser.** S-U grades only.

Structured, on-the-job learning experience under supervision of communication professionals in a cooperating organization. Maximum of six credits total may be earned; no more than three per internship but flexibility allows six for one credit each, three for two credits each, or two for three credits each. Internships must be approved in advance by the student's academic adviser and must be supervised by a communication professional in fields of public relations, advertising, publishing, or broadcasting. Minimum of 60 on-the-job hours per credit required.

COMM 497 Individual Study in Communication

Fall or spring. 1–3 credits; may be repeated to 6 credits with a different supervising faculty member. Prerequisite: 3.0 cumulative average. Students must register with an Independent Study form (available in 140 Roberts Hall).

Individual study under faculty supervision. Work should concentrate on locating, assimilating, synthesizing, and reporting existing knowledge on a selected topic. Attempts to implement this knowledge in a practical application are desirable.

COMM 498 Communication Teaching Experience

Fall or spring. 1–3 credits; may be repeated to 6 credits with different courses. **Limited to juniors and seniors.** Intended for undergraduates desiring classroom teaching experience. Prerequisite: 3.0 cumulative average (2.7 if teaching assistant for a skill development course) and permission of the faculty member who will supervise the work and assign the grade. Students must register with an Independent Study form (available in 140 Roberts Hall).

Periodic meetings with the instructor cover realization of course objectives, evaluation of teaching methods, and student feedback. In addition to aiding with the actual instruction, each student prepares a paper on some aspect of the course.

COMM 499 Independent Research

Fall or spring. 1–3 credits; may be repeated to 6 credits. Limited to seniors and graduate students. Prerequisite: 3.0 cumulative average. Students must register with an Independent Study form (available in 140 Roberts Hall).

Permits outstanding students to conduct laboratory or field research in communication under appropriate faculty supervision. The research should be scientific: systematic, controlled, empirical. Research goals should include description, prediction, explanation, or policy orientation and should generate new knowledge.

COMM 510 Organizational Behavior and Communication

Fall. 3 credits. Lec, M W 10:10–11:00; sec, TBA. D. Krikorian.

Study of management and leadership in formal organizations with emphasis on the psychology of communication between supervisor and employee; examination of formal and informal communication networks, and interpersonal communciation in an organizational context. Case studies analyzed in lab. Lectures concurrent with COMM 410; graduate students should enroll in COMM 510.

COMM 610 Seminar in Organizational Communication

Spring. 3 credits. Prerequisites: COMM 410/510 or one course in organizational behavior or permission of instructor. Lec, M W 11:15–12:05; lab, F 10:10–12:05. D. Krikorian.

Examination of contemporary research on the social psychology of interpersonal communication in organizations including supervisor-employee relations, leadership style, work motivation, organizational socialization, and formal and informal communication networks.

COMM 618 Communication and Persuasion

Spring. 3 credits. Prerequisite: introductory research methods course and introductory psychology or social psychology course. T R 10:10–11:40. M. Campo.

The course focuses on theories of communication's influence on persuasion and attitude change. Students become familiar with a variety of social-psychological theories of attitude change and persuasion. Those theories are also applied to a variety of communication situations including mass communication, advertising, public relations/public information, and interpersonal communication. Lectures concurrent with COMM 418; graduate students should enroll in COMM 618.

COMM 620 Public Opinion and Social Processes

Fall. 3 credits. T R 10:10–11:25. M. Campo.

The course provides an overview of the theoretical and applied literature related to the concept "public opinion." Students investigate how public opinion is perceived and acted upon by society. Relationships between public opinion, communcation, and social psychological variables are examined. Public opinion is studied using current theoretical and practical applications. Analysis and interpretation of public opinion polls and trends in public opinion on specific issues. Lectures concurrent with COMM 420; graduate students should enroll in COMM 620.

COMM 622 Psychology of Television (and Beyond)

Fall. 3 credits. Prerequisites: introductory psychology or social psychology and introductory research-methods course. M W F 12:20–1:10. M. Shapiro.

A survey of knowledge about the psychological influence of television and other audio-visual communication technologies. Topics may include: the history of concerns about television and movies, who watches television and why, how people understand and mentally process television, how television influences thinking and emotions, the effects of various forms (including entertainment, news, and advertising), the future forms of mass media including multimedia and virtual reality. Lectures concurrent with COMM 422; graduate students should enroll in COMM 622.

COMM 624 Communication in the Developing Nations

Fall. 3 credits. Open to juniors, seniors, and graduate students. Lec, T 1:25–2:35; lab, T 2:35–4:25. R. D. Colle.

The role of communication in development programs, particularly in Third World nations. Emphasis is on communication interventions in agriculture, health, nutrition, family planning and community development, and especially on methods for designing communication strategies for reaching low-income, rural people. Among the approaches considered are extension, social marketing, and development support communication. Lectures concurrent with COMM 424; graduate students should enroll in COMM 624.

COMM 626 Impact of Communication Technologies

Spring. 3 credits. Open to seniors. M W 2:55–4:10. Staff.

Examines emerging technologies of communication, such as computer-based information systems and satellites and their potential for influencing communication processes and social systems. Also examines the impacts of previous communication innovations from cave painting to television. Meets with COMM 426; graduate students enroll in COMM 626.

COMM 639 Designing for Human Computer Interaction

Fall. 3 credits. Prerequisite: permission of instructor. Lec, T 11:40–12:55; lab 01, T 1:25–2:15; lab 02, R 1:25–2:15. G. Gay.

This course is concerned with key issues of the design of the interaction between computers and people. Students come away from the course with an ability to evaluate solutions to design problems and a familiarity with implementing HCI designs. Lectures concurrent with COMM 439; grad students should enroll in COMM 639.

COMM 640 Computer Mediated Communication: Theory and Practice

Spring. 3 credits. Prerequisite: permission of instructor. Lec, T 12:20–2:15; lab 01, T 11:15–12:05; lab 02, R 11:15–12:05. G. Gay.

Course focuses on the design of computer interfaces and software from the user's point of view. The goal is to teach user interface designs that "serve human needs" while building feelings of competence, confidence, and satisfaction. Topics include formal models of people and interactions, collaborative design issues, psychological and philosophical design considerations, and cultural and social issues. Lectures concurrent with COMM 440; graduate students should enroll in COMM 640.

COMM 641 Human-Computer Interaction

Spring. 3 credits. Offered odd-numbered years. T R 8:40–9:55. G. Gay.

An examination of how people relate to, think about, and think with new communication technologies in schools, homes, and the workplace. Using assigned readings from multiple disciplines, class exercises, field studies, and case studies, students study and critique aspects of human-computer interaction, social psychology, and other issues that shape the process and effectiveness of designing, implementing, and using computer systems.

[COMM 676 Communication Planning for Social and Behavioral Change
Spring. 3 credits. T R 10:10–11:25. Not offered 2001–2002. Staff.
Overview theories that guide and influence social change efforts. Research techniques and communication tools used in communication planning and campaign techniques and communication tools used in communication planning and campaign design are reviewed. Class discussion focuses on social change efforts in nutrition and health, rural development, marketing, and the environment. Course seeks to integrate theory, data-based generalizations, and planning processes into a comprehensive communication plan.]

COMM 680 Studies in Communication
Fall. 3 credits. Limited to graduate students in communication; others by permission of instructor. M W 8:40–9:55. J. Shanahan.
A review of classical and contemporary readings in communication, including key concepts and areas of investigation. An exploration of the scope of the field, the interrelationships of its various branches, and an examination of the role of theory in the research process.

COMM 681 Advanced Communication Theory
Spring. 4 credits. Prerequisite: COMM 680 or graduate standing and permission of instructor. M W 2:55–4:10 with additional meetings TBA. Staff.
Development of, and contemporary issues in, communication theory. Discussion includes the interaction between communication and society, social groupings, and mental processing.

COMM 682 Methods of Communication Research
Spring. 3 credits. Lec, M W 12:20–1:10; sec, F 12:20–2:15. Staff.
An analysis of the methods used in communication research. Emphasis is on understanding the rationale for survey, textual, experimental, and ethnographic research methods. Development of class research project from research question to final report. Computer use of Statistical Package for the Social Sciences (SPSS) to assist in data analysis. Familiarity with basic statistical concepts helpful.

[COMM 683 Quantitative Research Methods in Communication
Spring. 3 credits. Prerequisite: COMM 682 or equivalent. Lec, M 6:00–9:00 P.M. Not offered 2001–2002. Staff.
Experience in quantitative research techniques. The course provides an introduction to inter- and multi-disciplinary research through examination of the procedures, techniques, and assumptions associated with particular techniques of design and measurement, data collection, data preparation, data analysis, and hypothesis testing. Readings include a variety of fields and disciplines in the social and natural sciences.]

[COMM 685 Training and Development: Theory and Practice (also International Agriculture 685 and EDUC 685)
Spring. 4 credits. S-U grades optional. Charge for materials, $45. F 9:05–12:05; lab TBA. Not offered 2001–2002. Staff.
Analysis, design, conduct, administration, and evaluation of training programs for the development of human resources in small-farm agriculture, rural health and nutrition, literacy and nonformal education, and general community development. Design for scientists, administrators, educator-trainers, and social organizers in rural and agricultural development programs in the United States and abroad.]

COMM 686 Risk Communication
Spring. 3 credits. T R 1:25–2:15, lab R 2:30–4:25. C. Scherer.
An examination of theory and research related to the communication of scientific information about environmental, agricultural, food, health, and nutritional risks. Course concentrates on social theories related to risk perception and behavior. Case studies involving pesticide residues, waste management, water quality, environmental hazards, and personal health behaviors are examined. Emphasis is placed on understanding, applying, and developing theories of risk communication. Lectures concurrent with COMM 486; graduate students should enroll in COMM 686.

COMM 691 Seminar: Topics in Communication
Fall and spring. No credit. S-U grades only. Hours TBA. Staff.
Some weeks scholars from a wide variety of fields present varied topics in theory or research as it relates to communication; other weeks graduate students present thesis (project) proposals to faculty and peers.

COMM 694 Special Topics in Communication
Fall, spring, or summer. 1–3 credits variable. S-U grades optional. Prerequisite: permission of instructor. Hours TBA. Staff.
Study of topics in communication not otherwise provided by a department course and determined by the interest of the faculty and students.

COMM 700 MPS Project Research
Fall or spring. 1–6 credits. May be repeated for a maximum of 6 credits. S-U grades only. Prerequisite: permission of committee chair.
Project research for Master of Professional Studies (Communication) students.

[COMM 781 Seminar in Psychology of Communication
Spring. 3 credits. Letter grade. Offered odd-numbered years. Prerequisite: COMM 680 and 681 or equivalent graduate level theory in psychology or social psychology. Hours TBA. Not offered 2001–2002. M. Shapiro.
Discussion and analysis of selected current issues in the psychology of communication. Students discuss and synthesize current research and theory in the mental processing of communication.]

COMM 794 Seminar in Communication Issues
Fall, spring, or summer. 1–3 credits. Letter grade only. Prerequisite: permission of instructor.
Small group study of topical issue(s) in communication not otherwise examined in a graduate field course.

COMM 797 Graduate Independent Study
Fall, spring, or summer. 1–3 credits. Letter grade only. Prerequisite: permission of instructor.
Individual study concentrating on locating, assimilating, synthesizing, and reporting existing knowledge on a selected topic.

COMM 798 Communication Teaching Laboratory
Fall and spring. 1–3 credits each semester. Letter grade only. May be repeated once. Limited to graduate students. Prerequisite: permission of the faculty member who will supervise the work and assign the grade. Students must use the faculty member's section number to register. Graduate faculty.
Designed primarily for graduate students who want experience in teaching communication courses. Students work with an instructor in developing course objectives and philosophy, planning, and teaching.

COMM 799 Graduate Research
Fall, spring, or summer. 1–3 credits. Letter grade only. Prerequisite: appropriate communication graduate course work or permission of instructor.
Small-group or individual research based on original, empirical, data-based designs regarding topical issues in communication not otherwise examined in a graduate field course.

COMM 800 Master's-Level Thesis Research
Fall or spring. 1–6 credits. May be repeated for a maximum of 6 credits. S-U grades only. Prerequisite: permission of committee chair.
Thesis research for Master of Science (Communication) students.

COMM 901 Doctoral-Level Dissertation Research
Fall or spring. 1–9 credits. May be repeated for a maximum of 9 credits. S-U grades only. Prerequisites: completion of "A" exam; permission of committee chair.
Dissertation research for doctoral candidates.

CROP AND SOIL SCIENCES

S. D. DeGloria, chair; M. Alexander, P. C. Baveye, D. R. Bouldin, R. B. Bryant, J. H. Cherney, A. Comis, W. J. Cox, A. DiTommaso, J. M. Duxbury, E. C. Fernandes, G. W. Fick, D. L. Grunes, R. R. Hahn, S. D. Klausner, Q. Ketterings, L. V. Kochian, T. A. LaRue, J. Lehmann, M. B. McBride, J. Mt. Pleasant, R. L. Obendorf, W. D. Pardee, W. S. Reid, S. J. Riha, T. W. Scott, T. L. Setter, P. L. Steponkus, J. E. Thies, H. M. van Es, A. Van Wambeke, R. M. Welch

Note: class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

Courses by Subject

Crop Science: 311, 312, 314, 315, 317, 455, 608, 610, 612, 613, 614, 642, 691, 820, 920, 921

Environmental Information Science: 398, 411, 420, 465, 620, 660, 675, 694, 860, 960, 961

Soil Science: 260, 321, 362, 363, 365, 366, 372, 373, 471, 473, 483, 663, 666, 667, 669, 671, 693, 880, 980, 981

All following Crop and Soil Sciences course prefixes were previously listed as SCAS.

General Courses

CSS 190 Sustainable Agriculture
Fall. Credits variable, 2 or 3. Limited to 60 students. S-U grades optional. Lec, R 10:10; labs, M T 2:00–4:25. G. W. Fick.
This course is designed to be an enjoyable introduction to basic food production resources (soils, crops, and climates), and it emphasizes scientific principals of management that conserve or renew those resources for continuing benefit to society. The information is of general value for nonmajors and students new to the field. Laboratories include several field trips and stress hands-on experience with soils, crops, and descriptive climatology. Written assignments are prepared for the web. Extra credit can be earned by participation in team preparation and delivery of a lesson in sustainable agriculture.

CSS 494 Special Topics in Crop and Soil Sciences (undergraduate level)
Fall or spring. 4 credits maximum. S-U grades optional.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester begins. Courses offered under this number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

CSS 497 Individual Study in Crop and Soil Sciences
Fall or spring. 1–6 credits. S-U grades optional. Students must register with an Independent Study form (available in 140 Roberts Hall).
The topics in soil science, crop science, or environmental information science are arranged at the beginning of the term for individual study or for group discussions.

CSS 498 Teaching Experience in Crop and Soil Sciences
Fall or spring. 1–5 credits. Students must register with an Independent Study form (available in 140 Roberts Hall). S-U grades optional.
Teaching experience in soil science, crop science, or environmental information science is obtained by assisting in the instruction of a departmental course.

CSS 499 Undergraduate Research
Fall or spring. Credit TBA. Students must register with an Independent Study form (available in 140 Roberts Hall).
Independent research on current problems selected from any phase of crop science or soil science.

CSS 695 Planning and Reporting Research
Spring. 2 credits. First meeting the first T of the semester in 102 Bradfield. G. W. Fick.
New graduate students and students starting to write their theses have found this course very helpful. Topics covered include scientific writing, reviewing, seminar presentations, and poster presentations. The nature of science and the scientific method are also discussed along with professional ethics in the conduct and communication of science.

CSS 696 Seminar in Crop and Soil Sciences
Fall and spring. 1 credit. S-U grades only. Lec, T 3:30–4:30. Staff.
Current research and selected topics in the crop and soil sciences and related fields.

Crop Science

CSS 311 Grains and Nutriceuticals
Fall. 4 credits. Prerequisite: CSS 260 or BIOPL 241. Lecs, M W F 10:10; lab, M 1:25–4:25. 1 or 2 field trips during lab periods (until 5 P.M. or on weekends). R. L. Obendorf.
Globally, six seed crops provide 75 percent of the caloric and protein needs of mankind by direct consumption or indirectly through animal and microbial products. Seed crops for starch, protein, oil, fiber, sugar, nutriceutical, pharmaceutical, and industrial uses are emphasized, including adaptation, growth and development, environmental stress, optimization of yield and quality, and genetic . improvement in the context of food systems for improved health. Laboratory uses living plants, extensive crop garden, and computer simulation.

[CSS 312 Forage Crops
Spring. 4 credits. Prerequisites: introductory course in crop and/or soil science. Recommended: course in animal nutrition. Lecs, M W F 11:15; lab, T or W 1:25–4:25. Not offered spring 2002. G. W. Fick.
The production and management of crops used for livestock feed are considered in terms of establishment, growth, maintenance, harvesting, and preservation. Forage grasses, forage legumes, and corn are emphasized, and consideration is given to their value as livestock feed in terms of energy, protein, and other nutritional components.]

CSS 314 Tropical Cropping Systems: Biodiversity, Social, and Environmental Impacts (also INTAG 314)
Fall. 3 credits. Prerequisite: an introductory course in crop science or soil science or biology or permission of instructor. Lec, T R 8:40–9:55. E. C. Fernandes.
Characterization and discussion of: traditional shifting cultivation; lowland rice-based systems; upland cereal-based systems; smallholder mixed farming including root crops and livestock; plantation fruit and oil crop systems; and agroforestry. In addition to species diversity and domestication, factors such as climate, land quality, soil management, land tenure, labor, and markets are considered. The impact of tropical cropping systems on the environment are evaluated.

CSS 315 Weed Science
Fall. 4 credits. Prerequisite: introductory course in biology or botany. Lecs, T R 10:10–11:25; lab, T or W 2–4:25. A. DiTommaso.
Principles of weed science are examined. Emphasis is on: (a) weed biology and ecology; (b) chemistry of herbicides in relation to effects on plant growth and the environment; and (c) current management strategies that are relevant to both crop and noncrop ecosystems. Hands-on laboratory sessions cover weed identification and ecology, and herbicide selectivity and symptomology.

CSS 317 Seed Science and Technology (also HORT 317)
Fall. 3 credits. Prerequisite: BIOPL 241 or equivalent. Lecs, T R 11:40–12:30; lab, R 1:25–4:25. 2 all-day field trips will be scheduled during the semester. Offered alternate years. A. G. Taylor, Geneva Experiment Station. (Ithaca contact, R. L. Obendorf.)
The principles and practices involved in the production, harvesting, processing, storage, testing, quality management, certification, and use of high-quality seed from improved cultivars. Information is applicable to various kinds of agricultural seeds. Hands-on laboratory experience.

CSS 415 Principles and Practices of Agroforestry (also NTRES 415 and HORT 415)
Fall. 3 credits. Prerequisites: senior or graduate standing or permission of instructor. S-U option. Lec, M W F 10:10–11:00. Optional laboratory, CSS [SCAS] 416 (also NTRES 416 and HORT 416). E. Fernandes, K. Mudge, L. Buck, J. Lassoie.
An introduction to modern and traditional agroforestry systems which involves spatial or temporal integration of multipurpose woody plants (trees and/or shrubs) with annual or perennial crops and/or with livestock. Interactions between woody and nonwoody components of agroforestry systems are considered, based on above and below ground processes. The sustainability of agroforestry systems is critically examined from biophysical, socio-economic, and policy perspectives.

CSS 416 Principles and Practices of Agroforesty—Laboratory (also NTRES 416 and HORT 416)
Fall. 1 credit. Optional lab component of HORT 415 (also NTRES and CCS [SCAS]). S-U grades optional. Prerequisites: junior, senior, or graduate standing or permission of instructor; prior or concurrent enrollment in HORT 415. W 1:25–4:25. K. Mudge, E. Fernandes, L. Buck, J. Lassoie.
An integrated set of laboratory and field exercises designed to develop competency in diagnostic and management skills applied to agroforestry practice. Sessions include field trips to local practitioners as well as working demonstration farms and forests, case study design and analysis, use of computer-based sources of information, and practical skills with woody plants including identification, propagation, planting, pruning, and measurement.

CSS 455 Mineral Nutrition of Crops and Landscape Plants (also HORT 455)
Spring. 3–5 credits. Prerequisite: CSS 260 and BIOPL 242, or equivalent. Lecs, M W F 9:05; lab, R 1:30–4:00. Offered alternate years. H. C. Wien and staff.
A modular course on principles of plant mineral nutrition and nutrient management. A mandatory module on principles is followed by others on agronomic crops, vegetables, floriculture, and fruit crops. Each module carries one credit; a minimum of three credits must be taken in one semester. By the end of the course, students understand the principles of mineral nutrient function in crop plants, are able to diagnose deficiencies by symptoms and tissue tests, and devise organic and conventional nutrient management schemes that maximize productivity and mineral nutrient quality.

CSS 608 Water Status in Plants and Soils
Fall. 1 credit. Prerequisite: permission of instructor. S-U grades only. Lec, 1 hour TBA; lab, first class meeting R 1:25–4:25. Offered alternate years. T. L. Setter.
Covers techniques for field appraisal of the status of water in plants and soil, including methods used in physiological studies, such as the psychrometer, pressure chamber, gas exchange analyzer, and abscisic acid analysis with ELISA.

CSS 610 Physiology of Environmental Stresses
Spring. 3 credits. Prerequisite: BIOPL 242 or 341. Lecs, T R 10:10–11:25. Offered alternate years. P. L. Steponkus.
A study of the responses of plants to environmental stresses, with emphasis on thermal stresses including chilling, freezing, and high temperature injury. Emphasis is on the physiological and biochemical basis of injury and plant resistance mechanisms at the whole-plant, cellular, and molecular levels.

CSS 612 Seed Physiology and Biotechnology
Spring. 3 credits. Prerequisite: plant physiology. T R 8:30–9:55. R. L. Obendorf.
This course in seed biology describes the molecular, biochemical, physiological, environmental, and genetic regulation of seed development, maturation, and germination events including the deposition and mobilization of seed reserves with illustrations from the world's major food and feed seeds. Illustrations extend the principles to practical situations, industrial uses, and food systems for improved health.

CSS 613 Physiology and Ecology of Yield
Spring. 3 credits. Prerequisite: plant physiology. M W F 12:20. T. L. Setter.
A study of environmental constraints on crop-plant productivity from a physiological perspective. Acclimation responses and genetic adaptation are examined for temperature, light, water, compacted soil, and mineral nutrient environments. Topics include: photosynthesis and nitrogen assimilation, translocation, and partitioning; canopy-scale influences on solar radiation use efficiency; regulation of growth processes in leaf, root, and floral sinks in response to environment; seed set; water transport and stomatal regulation; root growth in flooded and compacted soils; and drought responses. Emphasis is on growth processes of vegetative plant organs.

[CSS 614 Weed Ecology and Management
Spring. 3 credits. Prerequisite: CSS 315 or equivalent. Lec, T R 10:10–11:25. Offered alternate years. Next offered spring 2003. A. DiTommaso.
An examination of plant ecological principles governing weed population dynamics and weed-crop competitive interactions in different crop and noncrop ecosystems. Application of these fundamentals for the development and implementation of environmentally sound and sustainable integrated weed management strategies is explored. Topics include seed biology and seedbank dynamics, weed demography and spatial variation, weed-crop interferences, bio-economic weed thresholds, and site-specific weed management.]

[CSS 642 Plant Mineral Nutrition (also BIO PL 642)
Spring. 3 credits. Prerequisite: BIO PL 341 or equivalent. Lecs, M W F 10:10–11. Offered alternate years. L. V. Kochian, R. M. Welch.
A detailed study of the processes by which plants acquire and utilize mineral nutrients from the soil. Topics include the uptake, translocation, and compartmentation of mineral elements; root-soil interactions; metabolism of mineral elements; the involvement of mineral nutrients in various physiological processes; and nutrition of plants adapted to extreme environmental stresses (e.g., acid soils). Specific mineral elements are emphasized to illustrate the above topics.]

CSS 691 Special Topics in Crop Science
Fall or spring. 1–6 credits. S-U grades optional. Hours TBA. Staff.
Study of topics in crop science that are more specialized or different from other courses. Special topics to be offered depend on staff and student interests.

CSS 820 Master's-Level Thesis Research in Crop Science
Fall or spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.
Limited to students specifically in a master's program.

CSS 920 Graduate-Level Thesis Research in Crop Science
Fall or spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.
Limited to students in a Ph.D. program **only before** the "A" exam has been passed.

CSS 921 Doctoral-Level Dissertation Research in Crop Science
Fall or spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.
Limited to students admitted for candidacy **after** the "A" exam has been passed.

Environmental Information Science

CSS 398 Environmental Microbiology (also BIOMI 397)
Fall. 3 credits. Prerequisite: BIOES 261 or BIOMI 290 or CSS (SCAS) 260 or permission of instructor. Lecs, M W F 10:10. W. C. Ghiorse.
The biology, behavior, and function of microorganisms in natural environments are discussed in relation to past and present environmental conditions on Earth. The role of microorganisms in ecologically and environmentally significant processes is also considered through discussion of specific topics such as elemental cycles, nutrient cycling, transformation of pollutant chemicals, wastewater treatment, and environmental biotechnology.

CSS 411 Resource Inventory Methods (also CEE 411)
Spring. 3 credits. Prerequisite: permission of instructor. Lec, M W 9:05–9:55; lab, M R 1:25–4:25. A. Lembo.
A survey of resource inventory methods applied to field-based studies of environmental systems. Laboratory emphasis is on using maps, spatial databases, global positioning systems, and aerospace imagery to discriminate, measure, inventory, and monitor environmental resources.

CSS 420 Geographic Information Systems
Fall. 4 credits. Prerequisite: CSS (SCAS) 411 or permission of instructor. Lecs, T R 9:05–9:55; lab, T 10:10–1:10, M W R F 1:25–4:25. A. Lembo.
Principles and applications of geographic information systems for the characterization and assessment of agronomic and environmental resources. Methods for accessing, updating, analyzing, and mapping spatial data and information are emphasized. Needs assessment, coordinate systems, database design and maintenance, data transformations, and map accuracy assessment are considered.

CSS 465 Global Positioning System
Fall and spring. 1 credit. Prerequisite: CSS 411 or CSS 420, or equivalent, or consent of instructor. Lec, F 1:25–4:25. A. Lembo.
Introduction to navigation-grade GPS instruments used in agricultural and environmental science. Topics include instrument familiarization; field-data collection and processing; real-time and post-differential correction; and GPS-GIS integration.

CSS 620 Spatial Modeling and Analysis
Spring. 3 credits. Prerequisites: CSS (SCAS) 420, CSS (SCAS) 461, or permission of instructor. Lecs, T R 9:05–9:55; lab, T W 1:25–4:25. A. Lembo.
Theory and practice in the development, integration, and visualization of spatial data for resource inventory, environmental process modeling, land classification and evaluation. Application and evaluation of advanced spatial analytical methods applied to environmental systems and databases of interest to the student are emphasized.

CSS 660 Remote Sensing Fundamentals (also CEE 610)
Fall. 3 credits. Prerequisite: permission of instructor. Lecs, M W 12:20–1:10; lab, T 2:30–4:25. W. D. Philpot.
An introduction to equipment and methods used in obtaining information about earth resources and the environment from aircraft or satellite. Coverage includes sensors, sensor and ground-data acquisition, data analysis and interpretation, and project design.

CSS 675 Modeling the Soil-Plant-Atmosphere System (also EAS 675)
Spring. 3 credits. Prerequisite: CSS (SCAS) 483 or equivalent. Offered alternate years. Lecs, T R 8:40–9:55. S. J. Riha.
Introduction to the structure and use of soil-plant-atmosphere models. Topics covered include modeling plant physiology, morphology, and development; potential crop production and crop production limited by moisture and nutrient availability; plant-plant competition; and land surface processes as well as model data requirements, validation and scale. Use of soil-plant-atmosphere models for teaching, research, extension, and policy formation are discussed.

CSS 694 Special Topics in Environmental Information Science
Fall or spring. 1–6 credits. S-U grades optional. Hours TBA. Staff.
Study of topics in environmental science that are more specialized or different from other courses. Special topics to be covered will depend on staff and student interests.

CSS 860 Master's-Level Thesis Research in Environmental Information Science
Fall or spring. Credit by arrangement. S-U grades only. Graduate faculty.
Limited to students specifically in a master's program.

CSS 960 Graduate-Level Dissertation Research in Environmental Information Science
Fall or spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.
Limited to students in a Ph.D. program **only before** the "A" exam has been passed.

CSS 961 Doctoral-Level Dissertation Research in Environmental Information Science
Fall or spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.
Limited to students admitted to candidacy **after** the "A" exam has been passed.

Soil Science

CSS 260 Soil Science (also EAS 260)
Fall. 4 credits. S-U grades optional. Lecs, M W F 9:05; lab, M T W or R 1:25. S. Riha.
Designed for students interested in a comprehensive introduction to soil science from both an environmental and plant management perspective, this course is divided into three units. A unit on soil information introduces students to soil characterization, testing, mapping, classification, GIS, and land evaluation. A soil management unit addresses fertility, pest management, water, and microclimate, as well as erosion, conservation, pollution, and soil health. The unit on the role of soils in ecosystems considers topics such as biodiversity, soils as sinks and sources of greenhouse gases, and the impact of soils on land use. Labs are initially field-oriented with an emphasis on learning practical skills needed to evaluate and manage soils. Subsequent labs focus on accessing, interpreting and applying soil information.

CSS 321 Soil and Water Management
Fall. 4 credits. Prerequisites: CSS (SCAS) 260. S-U grades optional. Lecs, T R 11:40–12:55; lab, R 2:30–4:25. Offered alternate years. H. M. van Es.
Introduces students to the principles of soil and water interaction and to the effects of human intervention on these processes. Aspects of soil and water management, including hydrology, soil erosion and conservation, water management, contaminant movement, tillage, soil compaction, and water quality are examined. Case studies and policy approaches from both the United States and abroad are discussed.

CSS 362 Soil Morphology
Fall. 1 credit. Undergraduates only. Recommended for sophomores and juniors. R 1:25–4:25; all day field trip required. R. B. Bryant.
The principles for field identification of soil properties, profiles, and landscapes are presented. A series of soil pits are examined, described, classified, and interpreted in the field.

CSS 363 Soil Genesis, Classification, and Survey
Fall. 4 credits. Prerequisite: CSS (SCAS) 260. Lecs, M W F 11:15; lab, W 1:25–4:25. 1 all day field trip is required. R. B. Bryant.
Factors and processes of soil formation on which soil survey is based are discussed. Principles of field identification, classification, survey, and interpretation are practiced in a field setting. An overview of soil databases, their content, development, and use for site evaluation and land classification is provided.

CSS 365 Environmental Chemistry: Soil, Air, and Water
Spring. 3 credits. Prerequisites: CHEM 207–208. Lecs, M W F 10:10–11:00. M. B. McBride.
An overview of the chemical processes that control the concentrations and bioavailability of nutrients and pollutants in soil, air, and water. Particular attention is given to soil's function as a filter for contaminants. The history of environmental contamination and its impact on agricultural soils and ecosystems is described.

CSS 366 The Soil Ecosystem (also HORT 366)
Spring. 3 or 4 credits. Lecture only, 3 credits; lecture plus lab, 4 credits; lab cannot be taken without lecture. Prerequisite: one year intro biology. Lecs, T R 10:10–11:25; lab, W 1:25–4:25. J. E. Thies, L. E. Drinkwater.
Activities of the soil biota are crucial for the continued functioning and renewal of soil ecosystems. Through study of the soil as an ecosystem, students gain an understanding of the diversity of soil organisms and the critical roles that microbial activities and interactions have in agricultural production and environmental protection. Through a small research project, students also gain competencies in developing research questions and formulating hypotheses, planning appropriate methods for gathering and interpreting data, and summarizing research work.

CSS 372 Nutrient Management in Agro-Ecosystems Soil Fertility Management
Spring. 4 credits. Prerequisite: CSS (SCAS) 260 or permission of instructor. Lec, T R 8:40–9:55; lab, R 1:25–4:25. J. Lehmann.
Students become familiar with the basic concepts of soil fertility, and how soil and environmental properties affect nutrient availability and cycling. Discussion focuses on the way organic farming and soil conservation affect the fate of nutrients in agro-ecosystems. Emphasis is placed on the way nutrient management can be improved without creating environmental hazards. Students have hands-on training in analytical procedures and expand knowledge in discussion groups and through oral as well as poster presentations.

CSS 471 Properties and Appraisal of Soils of the Tropics
Spring. 3 credits. Prerequisite: CSS (SCAS) 260 or equivalent. S-U grades optional. No audits accepted. Offered alternate years. Lecs, T R 12:20; disc, W 1:25–3:25. A. VanWambeke.
The course examines the conditions in which soils form, and considers ecological, geological, and vegetational factors that produce the diversity that exists among them. The major kinds of soils are recognized, their management properties described, and methods to alleviate the constraints to crop production and the preservation of the environment examined. Topics include the identification of soils, and their functions in sustaining traditional farming systems and advanced technological packages. The course pursues these themes reviewing the most recent sources of information generated in tropical countries and published in Latin-American, French, and English journals. The last part of the course gives special attention to salt-affected soils, paddy rice cultivation, and the characteristics of acid-sulfate soils. Lectures include slides of soils, landscapes, and cropping systems.

[CSS 473 Ecology of Agricultural Systems (also BIOEE 473)
Fall. 3 credits. Limited to 45 students. Prerequisite: BIOEE 261 or permission of instructor. S-U grades optional. Lec and disc, T R 2:30–3:45. During the first 6 weeks of class, the Thursday meetings may run to 5:30 because of field trips. Not offered 2001–2002. Next offered fall 2002. A. G. Power and E. C. Fernandes.
Analysis of the ecological processes operating in agricultural systems, with an emphasis on the interactions between organisms. Topics include nutrient dynamics in agroecosystems, plant competition and facilitation, intercropping, the ecology of species invasions, mutualism in agroecoystems, plant-herbivore relations, plant-pathogen interactions, biological pest control, and evolutionary processes in agriculture. Case studies from both the tropics and the temperate zone are used to illustrate important concepts.]

CSS 483 Environmental Biophysics (also EAS 483)
Spring. 3 credits. Prerequisite: CSS (SCAS) 260 or equivalent or permission of instructor. Lecs, M W F 11:15. S. J. Riha.
Introduction to basic principles of energy and mass transfer and storage in soil-plant systems. Energy budgets, soil heat flow, water movement in saturated and unsaturated soils, evapotranspiration, water, gas, and nutrient dynamics in the soil-plant-atmosphere continuum are covered. Applications to agronomic and environmental problems and instrument design and use are considered through discussion and problems sets.

CSS 663 Pedology
Spring. 3 credits. Prerequisite: CSS (SCAS) 361 or permission of instructor. M W F 12:20. Offered even spring semesters. R. B. Bryant.
Weathering, reactions, and processes of soil genesis. Principles of soil classification and the rationale and utilization of soil taxonomy. Development and significance of major groups of soils of the world.

CSS 666 Plant/Microbe Interactions
Fall. 3 or 4 credits. Prerequisite: CSS 366 or equivalent, or permission of instructor. Lecs, T R 10:10–11:25; lab, F 1:25–4:25. Offered alternate years. J. E. Thies.
Discussions on current research into plant/microbe interactions including: molecular signaling between plants and microbes involved in symbiotic, associative, or pathogenic interactions; and new methodologies for understanding the role(s) soil microorganisms play in plant production. Students participating in the optional lab section (for a total of four credits) undertake a group research project of current interest, the results of which will be presented in a final seminar.

CSS 667 Advanced Soil Physics
Spring. 3 credits. Prerequisites: one year of college physics and CSS (SCAS) 483 or permission of instructor. S-U grades optional. Hours TBA. Offered alternate years. P. C. Baveye.
A detailed study of measurement processes and of the hydrostatics of aqueous solutions in soils and porous media, with emphasis on fundamental principles. Examination of the molecular aspects of water-solid interactions, including shrink-swell phenomena and the properties of absorbed water. Analysis of equilibrium water adsorption from thermodynamical and mechanistic (molecular) standpoints. Also covered are mechanical and thermodynamical analysis of the equilibrium status of aqueous solutions in deformable soils. Formal lectures are complemented by tutorial sessions.

CSS 669 Organic Matter—Soils, Sediments, and Waters
Spring. 3 credits. Prerequisites: CSS (SCAS) 260 and CHEM 357–358 or equivalent. M W F 9:05. J. M. Duxbury.
A discussion of current concepts on the chemical nature, dynamics, and properties of natural organics and organo-mineral associations in terrestrial and aquatic environments. Interaction with anthropogenic organics and effects of anthropogenic activities on natural organics are considered.

CSS 671 Soil Chemistry
Fall. 3 credits. Prerequisite: 1 year of physical chemistry or permission of instructor. Offered alternate years. Lecs, M W F 10:10. M. B. McBride.
A detailed examination of the structure and surface chemistry of colloidal particles common to soils. Ion exchange, mineral-solution equilibria, and adsorption reactions of silicate clays, oxides, and organic matter are emphasized. The behavior of environmental contaminants in soils, particularly metals and toxic organics, is described.

CSS 693 Special Topics in Soil Science
Fall, spring, or summer. 1–6 credits. S-U grades optional.
Study of topics in soil science that are more specialized or different from other courses. Special topics to be covered will depend on staff and student interests.

CSS 880 Master's-Level Thesis Research in Soil Science
Fall or spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.
Limited to students specifically in a master's program.

CSS 980 Graduate-Level Dissertation Research in Soil Science
Fall or spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.
Limited to students in a Ph.D. program **only before** the "A" exam has been passed.

CSS 981 Doctoral-Level Dissertation Research in Soil Science
Fall or spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.
Limited to students admitted to candidacy **after** the "A" exam has been passed.

EARTH AND ATMOSPHERIC SCIENCES

B. L. Isacks, chair; S. J. Riha, associate chair; D. S. Wilks (atmospheric science), R. W. Kay (geological sciences), K. H. Cook (science of earth systems), undergraduate advising coordinators; R. W. Allmendinger, W. Allmon, M. Barazangi, J. M. Bird, L. D. Brown, L. M. Cathles, J. L. Cisne, S. J. Colucci, A. T. DeGaetano, L. A. Derry, P. J. Gierasch, C. H. Greene, T. E. Jordan, S. Mahlburg Kay, M. C. Kelley, F. H. T. Rhodes, D. L. Turcotte, W. M. White, M. W. Wysocki

EAS 101 Introductory Geological Sciences
Fall, spring, or summer. 3 credits. Fall and spring, A. Moore; summer, W. Brice.
Designed to enhance an appreciation of the physical world. Natural environments, surface temperatures, dynamic processes such as mountain belts, volcanoes, earthquakes, glaciers, and river systems are emphasized. Interactions of the atmosphere, hydrosphere, biosphere, and lithosphere (Earth System Science) are covered. Water, mineral, and fuel resources and environmental concerns are also examined. Field trips in the Ithaca region.

EAS 102 Evolution of the Earth and Life (also BIO G 170)
Spring. 3 credits. J. L. Cisne.
This course covers: earth systems and their evolution; earth history's astronomical context; plate tectonics, continental drift, and their implications for climate and life; coevolution of life and the atmosphere; precedents for ongoing global change; and dinosaurs, mass extinctions, and human ancestry. Includes laboratories on reconstructing geological history and mapping ancient geography. Fossil collecting on field trips.

EAS 104 The Sea: An Introduction to Oceanography (also BIO EE 154)
Spring, summer. 3–4 credits (4 credits with lab section). Spring, C. H. Greene, W. M. White; summer, J. Chiment.
A survey of the physics, chemistry, geology, and biology of the oceans for both science and nonscience majors. Topics include: seafloor spreading and plate tectonics, marine sedimentation, chemistry of seawater, ocean currents and circulation, the oceans and climate change, ocean ecology, coastal processes, marine pollution, and marine resources.

[EAS 105 Writing on Rocks
Fall. 3 credits. Freshman Seminar. Not offered 2001–2002. J. Chiment.
See Freshman Seminar Handbook for description.]

EAS 106 Vertebrate Fossil Preparation
Spring. 1 credit. Prerequisites: 1 introductory geology course or concurrent enrollment, class size is limited. J. Chiment.
A laboratory-oriented course that exposes students to techniques of vertebrate fossil preparation. Roughing-out and fine preparation of large specimens in solid matrix are covered, as well as screen washing and microscope techniques for the recovery of micro-vertebrate remains. Specialized scanning techniques are discussed. The class meets for one hour each week for the first six weeks of the semester. Students are assigned to an individual or group project requiring two hours of participation each week for the remainder of the semester.

EAS 107 How the Earth Works
Fall. 1 credit. J. L. Cisne.
A user-friendly introduction to the workings and interactions of solid earth, ocean, atmosphere, and life as they relate to understanding ongoing global change.

EAS 109 Dinosaurs
Fall. 1 credit. J. L. Cisne.
An introductory survey course for anyone interested in dinosaurs. Lectures examine the fossil evidence and illustrate how various geological and biological disciplines contribute to understanding dinosaurs and their world.

EAS 111 To Know the Earth
Fall. 3 credits. J. M. Bird.
Acquaints the nonscientist with Earth, its major features, how the Earth has evolved, Earth System Science, and building a habitable planet. Covers the effects of human activity on geologic environments, mitigating environment damage, and living with natural hazards. Also covers mineral resource use in the twenty-first century and an environmentally sound fuel-minerals cycle.

EAS 122 Earthquake! (also ENGRI 122)
Spring. 3 credits. L. D. Brown.
The science of natural hazards and strategic resources is explored. Covers techniques for locating and characterizing earthquakes and assessing the damage they cause; methods of using sound waves to image the Earth's interior to search for strategic minerals; and the historical importance of such resources. Includes seismic experiments on campus to probe for groundwater, the new critical environmental resource.

EAS 131 Basic Principles of Meteorology
Fall. 3 credits. Lecs, T R 11:15; lab, T W or R 1:25–4:25 and M W 7:00–9:30 P.M. M. W. Wysocki.
A simplified treatment of the structure of the atmosphere: heat balance of the Earth; general and secondary circulations; air masses, fronts, and cyclones; and hurricanes, thunderstorms, tornadoes, and atmospheric condensation. In the laboratory, emphasis is on techniques of analysis of weather systems.

EAS 150 Introduction to Fortran Programming
Fall. 3 credits. Lec, T R 12:20–1:10; lab T 1:25–3:32. M. W. Wysocki.
An introduction to the elements of computer programming using Fortran. Exercises involve mainly meteorological problems.

EAS 200 Art, Archaeology, and Analysis (also ARKEO 285, ARTH 200, ENGRI 185, PHYS 200)
Spring. 3 credits. R. W. Kay.
An interdepartmental course on the use of techniques of science and engineering in cultural research. Applies physical and physiological principles to the study of archaeological artifacts and works of art. Covers historical and technical aspects of artistic creation. Includes analyses by modern methods to deduce geographic origins, and for exploration, dating, and authentication of cultural objects. Does not meet liberal studies distribution requirement for engineering.

EAS 201 Introduction to the Physics and Chemistry of the Earth (also ENGRD 201)
Fall. 3 credits. Prerequisites: PHYS 112 or 207. L. M. Cathles.

This course covers: formation of the solar system: accretion and evolution of the Earth; the rock cycle: radioactive isotopes and the geological time scale, plate tectonics, rock and minerals, earth dynamics, mantle plumes; the hydrologic cycle: runoff, floods and sedimentation, groundwater flow, and contaminant transport; and the weathering cycle: chemical cycles, CO_2 (weathering), rock cycle, controls on global temperature (CO_2 or ocean currents), and oil and mineral resources.

[EAS 203 Natural Hazards and the Science of Complexity

Fall. 3 credits. Prerequisites: 1 calculus course. Not offered 2001–2002. D. L. Turcotte.

Studies of natural hazards; earthquakes, volcanic eruptions, floods, hurricanes, tornadoes, severe storms, wildfires, and meteor impacts. Covers applications of the science of complexity to natural hazards: fractals, chaos, and self-organized criticality.]

EAS 210 Introduction to Field Methods in Geological Sciences

1 lec, Saturday field trips. 3 credits. Prerequisite: GEOL 101 (or 201) or permission of instructor. R. Allmendinger.

Considers the methods by which rocks are used as a geological database. Covers field methods used in the construction of geologic maps and cross sections; systematic description of stratigraphic sections. Field and laboratory sessions meet on Saturdays until Thanksgiving. There is also one additional lecture during most of these weeks. There is one weekend field trip to eastern New York.

EAS 212 Caribbean Field Trip

Spring. 2 credits. Prerequisite: permission of instructor. Enrollment limited to 15. Approximate cost $1,100. L. D. Brown.

A multidisciplinary look at earth science and environmental issues represented in the Yucatan Peninsula of Mexico. Base for operations is the Centro Ecologico Akumal, located on the Caribbean coast south of Cancun. This coast and its associated reef epitomizes the conflict between ecological preservation and economic development on an international scale. Excursions may include visits to Merida, a historic Spanish town which lies above the buried impact structure that many believe resulted in the death of the dinosaurs; ruins at Chichen Itza, Mayapan, Coba, and Tulum associated with the rise and fall of Mayan culture; and wildlife (monkeys, jaguars, crocodiles) preserves where recent geological studies have found evidence that the fall of the Mayans may have been triggered by climate change. The field trip features snorkel tours of reefs and lagoons as well as the cenotes (sinkholes) that characterize this classic karst landscape. Weekly lectures during the semester provide background; field trip scheduled for January.

EAS 213 Marine and Coastal Geology

Summer. 2 credits. Prerequisites: an introductory course in geology or permission of instructor. Staff.

A special one-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island near Portsmouth, New Hampshire. For more details and an application, consult the SML office, G14 Stimson Hall. Estimated cost for 2002 (including tuition, room, board, and ferry transportation) is $1,100.

EAS 250 Meteorological Observations and Instruments

Spring. 3 credits. Prerequisite: EAS 131. Lecs, M W 12:20; lab, R 1:25–3:20. M. W. Wysocki.

This course covers methods and principles of meteorological measurements and observations including surface, free-air, and remote systems. Also covered are: instrument siting, mounting, and protection; instrument response characteristics, calibration, and standardization; and recorders and data logging systems. Laboratory exercises are in observation and data analysis. The course is intended to serve as preparation for Observers Examination. Lab fee $50.

EAS 260 Soil Science (also CSS 260)

Fall. 4 credits. S-U grades optional. Lecs, M W F 9:05; lab, M T W or R 1:25. S. J. Riha.

Designed for students interested in a comprehensive introduction to soil science from both an environmental and plant management perspective, this course is divided into three units. A unit on soil information introduces students to soil characterization, testing, mapping, classification, GIS, and land evaluation. A soil management unit addresses fertility, pest management, water, and microclimate, as well as erosion, conservation, pollution, and soil health. The unit on the role of soils in ecosystems considers topics such as biodiversity, soils as sinks and sources of greenhouse gases, and the impact of soils on land use. Labs are initially field-oriented with an emphasis on learning practical skills needed to evaluate and manage soils. Subsequent labs focus on accessing, interpreting, and applying soil information.

EAS 268 Climate and Global Warming

Spring. 3 credits. Prerequisite: basic college math. S-U grades optional. Lecs, M W F 9:05. A. T. DeGaetano.

Students from a range of disciplines become familiarized with such contemporary issues in climatology as global warming and El Niño. Introductions to the natural greenhouse effect, past climates, observed and projected climate changes and impacts. Also natural climate variations (e.g. El Niño) and their consequences and predictability. Weekly student-led discussions of issues appearing in journals such as *Nature*.

EAS 296 Forecast Competition

Fall and spring. 1 credit. S-U grades only. Prerequisites: sophomore undergraduate standing in atmospheric science, or permission of instructor. Time TBA. D. S. Wilks.

This two-semester course provides daily exercise in probabilistic weather forecasting, in which students compete to forecast local weather most skillfully. Enroll for two consecutive semesters, with credit awarded after the second semester. May be repeated for credit.

EAS 302 Evolution of the Earth System (also SES 302)

Spring. 4 credits. Prerequisites: MATH 112 or 192 and CHEM 207 or equivalent. Lecs and disc, TBA. W. White and staff.

Co-evolution of life and the Earth system: Earth's early history; plate tectonics, continental drift, and climate changes during the past billion years; mountain building, ice ages, and our own emergence during the past ten million years. Introduction to methods of interpreting information preserved in the rock record.

EAS 315 Geomorphology

Fall. 4 credits. Prerequisite: one course in either geology, hydrology, or soil science. T. E. Jordan and B. L. Isacks.

A study of the processes that sculpt the Earth's landscapes (above and below sea level) and the nature of those landforms. Landforms constructed by Earth's internal processes are the point of departure, as we examine their modification by physical interaction with the atmosphere and oceans. Also treated are depositional landforms that are generated by accumulations of grains or sediment. Laboratory exercises include both field examination of landforms of the Finger Lakes area and computer analysis of satellite images and Digital Elevation Models of examples from around the globe. Two Saturday field trips.

EAS 321 Introduction to Biogeochemistry (also SES 321, NTRES 321)

Fall. 4 credits. Prerequisites: CHEM 207, MATH 112, plus a course in biology and/or geology. L. A. Derry, J. Yavitt.

Control and function of the Earth's global biogeochemical cycles. The course begins with a review of the basic inorganic and organic chemistry of biologically significant elements, and then considers the biogeochemical cycling of carbon, nutrients, and metals that take place in soil, sediments, rivers, and the oceans. Topics include weathering, acid-base chemistry, biological redox processes, nutrient cycling, trace gas fluxes, bio-active metals, the use of isotopic tracers, and mathematical models. Interactions between global biogeochemical cycles and other components of the Earth system are discussed.

EAS 326 Structural Geology

Spring. 4 credits. Prerequisite: MATH 112, EAS 101 or 201, or permission of instructor. R. W. Allmendinger.

Nature and origin of deformed rocks at microscopic to macroscopic scales, with emphasis on structural geometry and kinematics. Topics include stress, strain, rheology, deformation mechanisms, minor structures, faulting, folding, and structural families.

EAS 331 Climate Dynamics (also ASTRO 331)

Fall. 4 credits. Prerequisites: MATH 112 or 192 or equivalent. Lecs, M W F 1:25–2:25; disc, W 2:30. K. H. Cook and P. J. Gierasch.

Processes that determine climate and contribute to its change are discussed, including atmospheric radiation, ocean circulation, and atmospheric dynamics. Contemporary climate change issues are investigated and discussed in the context of natural variability of the system.

EAS 334 Microclimatology

Spring. 3 credits. Prerequisite: A course in physics. T R 10:10–11:25. Offered alternate years. D. S. Wilks.

The relationships of radiant energy, temperature, wind, and moisture in the atmosphere near the ground. The interplay between physical processes of the atmosphere, plant canopies, and soil is examined with emphasis on the energy balance.

EAS 341 Atmospheric Thermodynamics and Hydrostatics
Fall. 3 credits. Prerequisites: 1 year of calculus and 1 semester of physics. M W F 9:05–9:55. M. W. Wysocki.
Introduction to the thermodynamics and hydrostatics of the atmosphere and to the methods of description and quantitative analysis used in meteorology. Topics covered include thermodynamic processes of dry air, water vapor and moist air, and concepts of hydrostatics and stability.

EAS 342 Atmospheric Dynamics
Spring. 3 credits. Prerequisites: 1 year each of calculus and physics. K. H. Cook and P. J. Gierasch.
Introduction to atmospheric dynamics and to the methods of description and quantitative analysis used in meteorology. Topics considered include equations of atmospheric motion, motion in the free atmosphere, vertical variations of wind and pressure fields, mathematical representation and characteristics of fronts, mechanisms of pressure change, concepts of circulation and vorticity, and effects of friction on atmospheric motion.

EAS 352 Synoptic Meteorology I
Spring. 3 credits. Prerequisites: EAS 341 and concurrent enrollment in EAS 342. Lecs, T R 9:05; lab, M 1:25–3:25. M. W. Wysocki.
Weather map analysis and forecasting techniques are studied by applying the principles of fluid and heat flow. This course strengthens previously introduced meteorological concepts which are applied to forecasting midlatitude synoptic scale weather systems, such as cyclones, anticyclones, jet streams, fronts, and waves.

EAS 355 Mineralogy
Fall. 4 credits. Prerequisite: EAS 101 or 201 and CHEM 207 or permission of instructor. S. Mahlburg Kay.
Examination of minerals by hand-specimen properties and optical microscopy. Geological setting, classification, crystal structures, phase relations, chemical properties, and physical properties of minerals are covered. X-ray diffraction is introduced. Includes an independent research project.

EAS 356 Petrology and Geochemistry
Spring. 4 credits. Prerequisite: EAS 355. R. W. Kay.
Principles of phase equilibrium as applied to igneous and metamorphic systems. Description, classification, chemistry, origin, regional distribution, and dating of igneous and metamorphic rocks. Geochemical distribution of trace elements and isotopes in igneous and metamorphic systems. Also covers the petrological evolution of the planets.

EAS 375 Sedimentology and Stratigraphy
Fall. 4 credits. Prerequisite: EAS 101 or 201. J. L. Cisne.
Covers formation of sedimentary rocks; depositional processes and environments; correlation of strata in relation to time and environment; petrology of sandstones and limestones; geological age determination; reconstruction of paleogeography and interpretation of Earth history from stratigraphic evidence; and organization of strata in stratigraphic sequences.

EAS 388 Geophysics and Geotectonics
Spring. 4 credits. Prerequisites: MATH 192 (or 112) and PHYS 208 or 213. B. L. Isacks.
Covers global tectonics and the deep structure of the solid earth as revealed by investigations of earthquakes, earthquake waves, the Earth's gravitational and magnetic fields, and heat flow.

EAS 411 Satellite Remote Sensing in Geosciences
Fall. 3 credits. Prerequisite: permission of instructor. B. L. Isacks.
Instruction in satellite remote sensing, image processing, geographic information systems (GIS), and analysis or digital elevation models using advanced computer workstations via participation in current research on earthquakes, glaciers, and tectonics.

EAS 417 Field Mapping in Argentina
Summer. 3 credits. Prerequisites: EAS 210 and 326; Spanish desirable, but not required. S. Mahlburg Kay.
Modern techniques of geological mapping applied in the region of San Juan, Argentina, including folded and faulted sedimentary rock units of the Andean Precordillera (San Juan River section), intensely deformed Precambrian metamorphic rocks of the Pampean Ranges (Pie de Palo), and shallow-level silicic intrusives (Cerro Blanco-Ullun).

[EAS 423 Petroleum Geology
Fall. 3 credits. Recommended: EAS 326. Offered alternate years. Not offered 2001–2002. Staff.
Introduction to hydrocarbon exploration and development. Covers exploration techniques, including well logs, fluid pressures, seismic-reflection methods, gravity, and magnetic measurements to map subsurface structures and stratigraphy. Also covers: petroleum origin and migration; dispersal systems and depositional patterns of petroleum reservoirs; economics of exploration, leasing, drilling, and production; and estimates of petroleum reserves, including tar sands and oil shales.]

EAS 434 Reflection Seismology
Spring. 4 credits. Prerequisites: MATH 192 and PHY 208, 213, or equivalent. L. D. Brown.
Fundamentals of subsurface imaging by multichannel seismic reflection techniques as used in oil exploration and geohydrological investigations. Covers survey design, acquisition, analysis, processing, and interpretation in both 2-D and 3-D. Includes discussion of related techniques such as seismic refraction analysis, tomographic inversion, vertical seismic profiling, shear wave exploration, and ground penetrating radar. Lab is keyed to state-of-the-art seismic processing, modeling, and interpretation software from LandMark.

EAS 435 Statistical Methods in Meteorology and Climatology
Fall. 3 credits. Prerequisites: 1 introductory course each in statistics (e.g., AEM (ARME) 210) and calculus. T R 10:10–11:25. D. S. Wilks.
Statistical methods used in climatology, operational weather forecasting, and selected meteorological research applications. Includes some statistical characteristics of meteorological data including probability distributions and correlation structures. Covers operational forecasts derived from multiple regression models including the MOS system. Also covers forecast verification techniques and scoring rules, time series analysis, EOFs, and other research topics as time permits.

EAS 437 Geophysical Field Methods
Fall. 3 credits. Prerequisites: PHYS 213 or 208, or permission of instructor. L. D. Brown.
Introduction to field methods of geophysical exploration, especially as applied to environmental issues. Emphasis is on seismic, ground penetrating radar, gravity, and magnetic techniques. Field surveys carried out at the beginning of the semester are analyzed and interpreted. A field companion to EAS 436, which is recommended but not required prior to this course.

[EAS 445 Geohydrology (also ABEN 471 and CEE 431)
Fall. 3 credits. Prerequisites: MATH 294 and ENGR 202. Not offered 2001–2002. W. Brutsaert, L. M. Cathles, J.-Y. Parlange, T. S. Steenhuis.
Intermediate-level study of aquifer geology, groundwater flow, and related design factors. Includes description and properties of natural aquifers, groundwater hydraulics, soil water, and solute transport.]

EAS 447 Physical Meteorology
Fall. 3 credits. Prerequisite: 1 year each of calculus and physics. M W F 10:10. Offered alternate years. A. T. DeGaetano.
Primarily a survey of natural phenomena of the atmosphere, with emphasis on their underlying physical principles. Topics include composition and structure of the atmosphere, atmospheric optics, acoustics and electricity, solar and terrestrial radiation, and principles of radar probing of the atmosphere.

EAS 451 Synoptic Meteorology II
Fall. 3 credits. Prerequisites: EAS 341 and 342. Lecs, T R 9:05; lab, M 1:25–3:20. S. J. Colucci.
Structure and dynamics of large-scale midlatitude weather systems, such as cyclones, anticyclones, and waves, with consideration of processes that contribute to temperature changes and precipitation. Laboratory sessions involve real-time weather forecasting and the computer application of a numerical model of the atmosphere to study selected large-scale midlatitude weather events.

[EAS 453 Advanced Petrology
Fall. 3 credits. Prerequisite: EAS 356. Offered alternate years. Not offered 2001–2002. R. W. Kay.
Magmas and metamorphism in the context of plate tectonics. Major and trace element chemistry and phase petrology as monitors of the creation and modification of igneous rocks. Temperature and stress in the crust and mantle and their influence on reaction rates and textures of metamorphic rocks. Application of experimental studies to natural systems.]

EAS 455 Geochemistry
Fall. 4 credits. Prerequisites: CHEM 207 and MATH 192 or equivalent. Recommended: EAS 356. Offered alternate years. W. M. White.
The Earth from a chemical perspective. Covers: the formation of the elements; cosmochemistry; chemical evidence regarding the formation of the Earth and solar system; trace-element geochemistry; isotope geochemistry; geochemical thermodynamics and kinetics; chemical evolution of the crust, mantle, and core; weathering and the chemistry of natural waters; chemistry of rivers and the oceans; hydrothermal systems; and ore deposition.

EAS 456 Mesoscale Meteorology
Spring. 3 credits. Prerequisites: EAS 341 and 342 or permission of instructor. T R 11:40–12:55. Offered alternate years. S. J. Colucci.
Structure and dynamics of midlatitude mesoscale weather systems such as fronts, jets, squall lines, convective complexes, precipitation bands, downslope windstorms, mountain breezes, sea breeze circulations, and lake effect snowstorms.

[EAS 457 Atmospheric Air Pollution
Fall. 3 credits. Prerequisites: EAS 341 or 1 course in thermodynamics, and 1 semester of chemistry, or permission of instructor. M W F 11:15–12:05. Offered alternate years. Not offered 2001–2002. M. W. Wysocki.
Course examines sources, effects, transport, measurement, and controls of air pollution. The basic principles in each area are discussed with an emphasis on their local, regional, and global impacts.]

[EAS 458 Volcanology
Spring. 3 credits. Corequisite: EAS 356 or equivalent. Offered alternate years. Not offered 2001–2002. R. W. Kay and W. M. White.
Causes of volcanism, melting in the Earth, and the origin of magmas. Physical volcanology, nature and types of volcanic eruptions and associated deposits, and eruption mechanisms. Volcanic plumbing systems, magma chamber processes, evolution of magma. Volcanism and impact phenomena in the solar system. Volcanic hazard assessment and volcano monitoring. Ore deposits associated with volcanism.]

[EAS 462 Marine Ecological Processes (also BIOEE 462)
Spring. 3 credits. Limited to 75 students. Prerequisite: BIOEE 261. Offered alternate years. Not offered 2001–2002. C. D. Harvell and C. H. Greene.
Lectures and discussion focus on current research in broad areas of marine ecology with an emphasis on processes unique to marine systems. A synthetic treatment of multiple levels of organization in marine systems including organismal, population, community, ecosystems, and evolutionary biology. Examples are drawn from all types of marine habitats, including polar seas, temperate coastal waters, and tropical coral reefs.]

EAS 475 Special Topics in Oceanography
Spring, summer. 2–5 var. credits. Prerequisites: EAS 104 or BIOEE 154, and permission of instructor. C. H. Greene.
Undergraduate instruction and participation in advanced areas of oceanographic research. Topics will change from term to term. Contact instructor for further information.

EAS 476 Sedimentary Basins: Tectonics and Mechanics
Fall. 3 credits. Prerequisite: EAS 375 or permission of instructor. T. E. Jordan.
Subsidence of sedimentary basins from the point of view of plate tectonics and geomechanics. Course covers interactions of subsidence, sediment supply, and environmental characteristics in development of stratigraphic sequences. Also covers stratigraphic characteristics of active-margin, passive-margin, and cratonic basins. Geophysical and stratigraphic modeling; sequence stratigraphy. Uses modern and ancient examples.

EAS 478 Advanced Stratigraphy
Fall. 3 credits. Prerequisite: EAS 375 or permission of instructor. Offered alternate years. T. E. Jordan.
Course covers modern improvements on traditional methods of study of ages and of genetic relations among sedimentary rocks, emphasizing 3-D relationships. Introduces techniques and applications of sequence stratigraphy at scales ranging from beds to entire basins. Physical correlation, dating techniques, and time resolution in sedimentary rocks are considered as are, physical controls on the stratigraphic record, and numerical modeling.

EAS 479 Paleobiology (also BIOEE 479)
Fall. 4 credits. Prerequisites: 1 year of introductory biology for majors and either BIOEE 274, 373, EAS 375, or permission of instructor. W. Allmon.
A survey of the major groups of organisms and their evolutionary histories. Intended to fill out the biological backgrounds of earth and atmospheric science students concerning the nature and significance of the fossil record for their respective studies.

EAS 481 Senior Survey of Earth Systems
Fall. 3 credits. Limited to seniors majoring in geological science. J. M. Bird.
A survey course that integrates undergraduate course work, intended to enhance overall understanding of geological sciences. Emphasis is on current models of Earth's dynamic systems (e.g., global climate change; mantle evolution). Utilizes guest lecturers; synthesis and review of literature; scientific literature readings; discussions; and student presentations.

[EAS 483 Environmental Biophysics (also CSS 483)
Spring. 3 credits. Offered alternate years. Prerequisites: EAS/CSS 260 or equivalent, or permission of instructor. M W F 11:15. Not offered 2001–2002. S. J. Riha.
Introduction to basic principles of energy and mass transfer and storage in soil-plant systems. Energy budgets, soil heat flow, water movement in saturated and unsaturated soils, evapotranspiration, water, gas, and nutrient dynamics in the soil-plant-atmosphere continuum are covered. Applications to agronomic and environmental problems and instrument design and use are considered through discussion and problem sets.]

EAS 491–492 Undergraduate Research
Fall, spring. 1 to 4 credits. Staff.
Introduction to the techniques and philosophy of research in the earth sciences and an opportunity for undergraduates to participate in current staff research projects. Topics chosen in consultation with, and guided by, a staff member. A short written report is required, and outstanding projects are prepared for publication.

EAS 494 Special Topics in Atmospheric Science (undergraduate level)
Fall or spring. 8 credits maximum. S-U grades optional. Staff.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. The same course is not offered more than twice.

EAS 496 Internship experience
Fall or spring. 1–2 credits. S-U grades only. Staff.

EAS 497 Individual Study in Atmospheric Science
Fall or spring. 1–6 credits. S-U grades optional. Students must register with an Independent Study form. Staff.
Topics are arranged at the beginning of the term for individual study or for group discussions.

EAS 498 Teaching Experience in Atmospheric Science
Fall or spring. 1–5 credits. S-U grades optional. Students must register with an Independent Study form. Staff.
Teaching experience is obtained by assisting in the instruction of an atmospheric science course.

EAS 499 Undergraduate Research in Atmospheric Science
Fall or spring. Credit by arrangement. Students must register with an Independent Study form. Staff.
Independent research on current problems in atmospheric science.

EAS 500 Design Project in Geohydrology
Fall, spring. 3–12 credits. An alternative to an industrial project for M.Eng. students choosing the geohydrology option. May continue over 2 or more semesters. L. M. Cathles.
The project may address one of the many aspects of groundwater flow and contamination, and must involve a significant geological component and lead to concrete recommendations or conclusions of an engineering nature. Results are presented orally and in a professional report.

EAS 502 Case Histories in Groundwater Analysis
Spring. 4 credits. L. M. Cathles.
Groundwater flow in a specific area, such as a proposed nuclear-waste disposal site, analyzed in depth. Geological and resource data on the area are presented early in the course. Then the material is analyzed by students working as an engineering analysis team. Each student makes a weekly progress report and writes part of a final report. Results are presented in a half-day seminar at the end of term.

EAS 622 Advanced Structural Geology I
Spring. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years. R. W. Allmendinger.
Stress-strain theory and application. Advanced techniques of structural analysis. Topics include finite and incremental strain measurement; microstructure, preferred orientation, and TEM analysis; and pressure solution and cleavage development; and experimental deformation. Applications to deformation of unconsolidated sediments, brittle and brittle-ductile deformation of supracrustal strata, and ductile deformation of high-grade metamorphic rocks. Kinematic analysis of shear zones and folds in these regimes.

[EAS 624 Advanced Structural Geology II
Spring. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years. Not offered 2001–2002. R. W. Allmendinger.
Geometry, kinematics, and mechanics of structural provinces. Concentration is on thrust belts, rift provinces, or strike-slip provinces. Covers techniques of balanced cross sections.]

EAS 628 Geology of Orogenic Belts
Spring. 3 credits. Prerequisite: permission of instructor. J. M. Bird.
A seminar course in which students study specific geologic topics of an orogenic belt selected for study during the term. The course is intended to complement EAS 681.

[EAS 634 Advanced Geophysics I: Fractals and Chaos in Geology and Geophysics
Spring. 3 credits. Prerequisite: EAS 388 or permission of instructor. Offered alternate years. Not offered 2001–2002. D. L. Turcotte.
Course covers: definitions of fractal sets and statistical fractals, scale invariance, self-affine fractals, multifractals, applications to fragmentation, seismicity and tectonics, petroleum distribution and reserves, ore grade and tonnage, drainage networks and landforms, and floods and droughts. Definitions of chaos and self-organized criticality, renormalization groups, diffusion limited aggregation and percolation clusters, wavelet transforms, applications to mantle convection, the Earth's dynamo, and distributed seismicity.]

EAS 635 Advanced Statistical Meteorology
Fall. 3 credits. Prerequisites: coursework in or elementary knowledge of statistics, calculus, matrix algebra, and computer programming. Lec, T R 10:10–11:25, R 11:35–12:05. D. S. Wilks.
Lectures and topics concurrent with EAS 435, plus an extra 30-minute session per week in which selected topics from EAS 435 are treated in more depth, and additional topics are covered which may vary from year to year according to student interest. A term project is required. Not open to students who have taken EAS 435 for credit.

[EAS 636 Advanced Geophysics II: Quantitative Geodynamics
Spring. 3 credits. Prerequisite: EAS 388 or permission of instructor. Offered alternate years. Not offered 2001–2002. D. L. Turcotte.
Stress and strain in the Earth, elasticity and flexure, heat transfer, gravity, fluid mechanics, rock rheology, faulting, chemical geodynamics, flow in porous media.]

[EAS 641 Analysis of Biogeochemical Systems
Spring. 3 credits. Prerequisite: MATH 293 or permission of instructor. Offered alternate years. Next offered 2002–2003. L. A. Derry.
Covers: dynamics of biogeochemical systems. Kinetic treatment of biogeochemical cycles. Box models, residence time, response time. Analytical and numerical solutions of model systems. Eigen-analysis of linear systems. Feedback and nonlinear cases, problems of uncertainties in natural systems. Modeling software such as Stella II and Matlab; applications to current research of participants or from recent literature.]

[EAS 651 Advanced Atmospheric Thermodynamics (also ASTRO 651)
Fall. 3 credits. Prerequisites: a good background in undergraduate calculus and physics is required. Offered alternate years. Not offered 2001–2002. K. H. Cook, P. J. Gierasch, S. J. Colucci.
A survey of the fundamental physical processes in atmospheres. Topics include thermodynamics of atmospheric gases, moist effects, hydrostatics, convective instability, atmospheric radiation and radiative heating, radiative-convective equilibrium, clouds, cloud microphysics, and precipitation processes. Thermal structure and greenhouse effects on the Earth and other planets is discussed. The course is taught at the level of *Fundamentals of Atmospheric Physics* by Salby.]

[EAS 652 Advanced Atmospheric Dynamics (also ASTRO 652)
Spring. 3 credits. Prerequisites: EAS 341 and 342 or permission of instructor. T R 11:40–12:55. Offered alternate years. Not offered 2001–2002. S. J. Colucci, K. H. Cook, P. J. Gierasch.
Course covers quasigeostrophic theory, atmospheric waves, hydrodynamic instability, the general circulation of the atmosphere, and other topics selected from among numerical weather prediction and tropical, mesoscale, and middle atmosphere processes according to student interest.]

EAS 656 Isotope Geochemistry
Spring. 3 credits. Open to undergraduates. Prerequisite: EAS 455 or permission of instructor. Offered alternate years. W. M. White.
Nucleosynthetic processes and the isotopic abundance of the elements. Geochronology and cosmochronology using radioactive decay schemes, including U-Pb, Rb-Sr, Sm-Nd, K-Ar, U-series isotopes, and cosmogenic isotopes such as ^{14}C and ^{36}Cl. Use of radiogenic and stable isotopes in petrology and their application to study of the evolution of the crust and mantle. Isotopic evidence regarding the formation of the Earth and the solar system. Stable isotopes and their use in geothermometry, ore petrogenesis, paleontology, and the global climate system.

EAS 675 Modeling the Soil-Plant-Atmosphere System (also CSS 675)
Spring. 3 credits. Prerequisites: EAS/CSS 483 or equivalent. T R 8:40–9:55. Offered alternate years. S. J. Riha.
Introduction to the structure and use of soil-plant-atmosphere models. Topics covered include modeling plant physiology, morphology, and development; potential crop production and crop production limited by moisture and nutrient availability; plant-plant competition; and land surface processes as well as model data requirements, validation, and scale. Use of soil-plant-atmosphere models for teaching, research, extension, and policy formation is discussed.

EAS 681 Geotectonics
Fall. 3 credits. Prerequisite: permission of instructor. J. M. Bird.
Theories of orogeny; ocean and continent evolution. Kinematics of lithosphere plates. Rock-time assemblages of modern oceans and continental margins, and analogs in ancient orogenic belts. Time-space reconstructions of specific regions. Also covers problems of dynamic mechanisms—corollaries and evidence from crustal features.

EAS 692 Special Topics in Atmospheric Science
Fall or spring. 1–6 credits. S-U grades optional. Staff.
Study of topics in atmospheric science that are more specialized or different from other courses. Special topics to be covered depend on staff and student interests.

EAS 695 Computer Methods in Geological Sciences
Fall, spring. 3 credits. L. Brown and B. L. Isacks.
Independent research projects using modern computational resources in the Department of Earth and Atmospheric Sciences. Possibilities include: image and seismic processing, seismic and geomechanical modeling, GIS, use of interpretational workshops for 3-D seismics and satellite imagery; modeling fluid flow through complex media.

EAS 700–799 Seminars and Special Work
Fall, spring. 1–3 credits. Prerequisite: permission of instructor. Staff.
Advanced work on original investigations in earth and atmospheric sciences. Topics change from term to term. Contact appropriate professor for more information.

EAS 722 Advanced Topics in Structural Geology
R. W. Allmendinger.

EAS 731 Plate Tectonics and Geology
J. M. Bird.

[EAS 733 Fractals and Chaos—Independent Studies
Not offered 2001–2002. D. L. Turcotte.]

EAS 751 Petrology and Geochemistry
S. Mahlburg Kay and R. W. Kay.

[EAS 753 Advanced Topics in Mineral Physics
Not offered 2001–2002.]

EAS 755 Advanced Topics in Petrology and Tectonics
J. M. Bird.

EAS 757 Current Research in Petrology
S. Mahlburg Kay and R. W. Kay.

[EAS 762 Advanced Topics in Petroleum Exploration
Not offered 2001–2002.]

EAS 771 Advanced Topics in Sedimentology and Stratigraphy
T. E. Jordan.

EAS 773 Paleobiology
J. L. Cisne.

EAS 775 Advanced Topics in Oceanography
Spring. C. H. Greene.

EAS 780 Earthquake Record Reading
Fall. M. Barazangi.

EAS 781 Geophysics, Exploration Seismology
L. D. Brown.

EAS 783 Advanced Topics in Geophysics
B. L. Isacks.

EAS 789 Lithospheric Seismology (COCORP Seminar)
L. D. Brown.

EAS 793 Andes-Himalaya Seminar
S. Mahlburg Kay, R. W. Allmendinger, B. L. Isacks, and T. E. Jordan.

EAS 795 Low Temperature Geochemistry
L. A. Derry.

EAS 796 Geochemistry of the Solid Earth
W. M. White.

EAS 797 Fluid-Rock Interactions
L. M. Cathles.

EAS 799 Soil, Water, and Geology Seminar
L. M. Cathles and T. S. Steenhuis.

EAS 850 Master's-Level Thesis Research in Atmospheric Science
Fall or spring. Credit by arrangement. S–U grades only. Hours by arrangement. Graduate faculty.
Limited to students specifically in the master's program in atmospheric science.

EAS 950 Graduate-Level Dissertation Research in Atmospheric Science
Fall or spring. Credit by arrangement. S-U grades optional. Hours by arrangement. Graduate faculty.
Limited to students in the atmospheric science Ph.D. program only **before** the "A" exam has been passed.

EAS 951 Doctoral-Level Dissertation Research in Atmospheric Science
Fall or spring. Credit by arrangement. S-U grades optional. Hours by arrangement. Graduate faculty.
Limited to students admitted to candidacy in the atmospheric science Ph.D. program **after** the "A" exam has been passed.

EDUCATION

D. E. Hedlund, chair; G. J. Applebee, N. T. Assie-Lumumba, C. A. Conroy, J. A. Dunn, D. M. Ewert, M. M. Kroma, S. K. Kroma, J. J. Lo, S. J. Peters, S. C. Piliero, G. J. Posner, R. E. Ripple, V. N. Rockcastle, D. E. Schrader, J. W. Sipple, H. D. Sutphin, D. J. Trumbull, D. G. Way, A. L. Wilson

EDUC 005 Basic Review Mathematics
Fall and spring. 3 credits (this credit is not counted toward the 120 credits required for the degree). Lecs, M W F 8:00 or 9:05. J. J. Lo.
Review of concepts necessary for success in basic mathematics and statistics courses. Topics include problem solving, graphing, basic algebra skills, linear and quadratic functions, polynomial equations, exponents and logarithms, and trigonometry. Considerable emphasis is placed on learning mathematics for understanding and solving word problems.

EDUC 100 Multiculturalism in Education
Fall. 3 credits. M W F 10:10–11:25. S. Kroma.
Should schools provide mandatory bilingual education programs to non-English speaking students? Should the United States adopt an "English Only" official language policy? Should Kwanza be celebrated as a public holiday? These are some of the many questions that challenge the notion of "cultural unity" one expressed as the "melting pot." In this course students develop writing skills as they explore discourse on the forces responsible for our cultural diversity and the changing perspectives on our "cultural unity." Through writing activities, students learn to critically examine the historical, political, and legal contexts of this diversity and define their own views on the competing public positions that multicultural education issues arouse.

[EDUC 101 Introduction to Education
Fall. 3 credits. T R 11:40–12:55. Not offered 2001–2002. Staff.
An introduction to the field of education that is structured around an examination of three contemporary policy issues. The issues are chosen to help students understand important aspects of formal schooling systems (e.g., the public schools, colleges, and universities) as well as nonformal educational activities (e.g., adult education, extension education, and community education). The course is team-taught by two members of the faculty and is designed for students seeking a self-contained introduction to education that can also lead to additional study in the field.]

EDUC 115 Introductory College Mathematics
Fall and spring. 4 credits. M W F 11:15 or 12:20. J. J. Lo.
Designed for students wishing to fulfill distribution requirements and/or prepare for study in calculus. This course offers a multi-representational approach to college-level precalculus mathematics, stressing conceptual understanding, problem solving, and applications in a technology-enhanced environment. Considerable emphasis is placed on numerical, graphical, and symbolic representations of functions and their transformations. Students use graphing calculators in a collaborative lab setting.

[EDUC 120 Education for Empowerment
Spring. 3 credits. W 1:25–4:25. Not offered 2001–2002. Staff.
Common themes running through the modules include human learning, teaching strategies, and political/social/economic factors affecting education. The course provides an opportunity to sample different areas of study and to gain knowledge and awareness of one's own educational processes.]

[EDUC 210 Psychology of Learning and Memory
Fall. 3 credits. Prerequisite: introductory psychology. W 2:00–4:25; plus time TBA. Not offered 2001–2002. J. A. Dunn.
This course deals with contemporary theories of learning, issues in the study of learning, and application of the principles of learning to the management of teaching and learning. Practical applications of research findings are emphasized. One or more experimental projects and the use of microcomputers is required.]

[EDUC 212 Psychological Foundations of Education
Spring and fall. 3 credits. Limited to 20 students. S-U option available. Prerequisite: introductory psychology. W 2–4:25 plus times TBA. Not offered 2001–2002. J. A. Dunn.
A lecture/discussion survey of the psychological foundations of educational practice. Topics include the selective contributions of developmental, social, and experimental psychology, including instructional technology, to American education.]

EDUC 220 Community Learning and Service Partnership
Fall and spring. 4 credits. Limited to 25 students. S-U grades optional. T R 2:55–4:10. A. Wilson.
Students learn to be self-directed learners and to be critical observers of their own experiential learning; class focuses on issues of diversity and empowerment, interpersonal communication, and critical analysis. Students practice adult education facilitation techniques through participation in a campus-based adult education program, the Community Learning and Service Partnership (CLASP).

EDUC 240 The Art of Teaching
Fall and spring. 3 credits. Fall: M 12:20–2:15 or T 2:30–4:25, W 12:20–2:15 or 2:30–4:25. Spring: M 8–9:55 or 12:20–2:15 or T 2:30–4:25 or W 12:20–2:15 or 2:30–4:25. Fall, staff; spring, G. J. Posner and staff.
This course is designed for all students interested in finding out more about teaching. Students engage in field experiences to find out what teaching involves. Possible field experiences range from large group to tutorial situations, from preschool to adult education, from traditional school subject matters to recreational and vocational areas, and from school-based to nonformal situations. Class work builds on those experiences and provides skills and concepts to make the field experiences more profitable.

EDUC 271 Sociology of Education
Fall. 3 credits. S-U grades optional. T R 10:10–11:25. J. W. Sipple.
An introduction to the sociological study of schooling and education. Topics include the effects of social factors on educational achievement, the norms and values learned as part of the process of schooling, the relations between students and teachers, and the school's relations to the economic and political systems. All levels of education, from elementary school to the university, are considered.

EDUC 311 Educational Psychology
Fall. 3 credits. Prerequisite: introductory psychology. S-U grades optional. M W F 11:15–12:05. D. E. Schrader.
This course applies psychological concepts to educational settings with a focus on understanding the interaction between people, context, and knowledge in schools and other learning environments. It examines education as a social, moral, and interpersonal enterprise that respects differences between individuals. This course is designed to foster effective teaching and learning across the life span, but has a focus on secondary education.

EDUC 317 Psychology of Adolescence
Spring. 3 credits. Prerequisite: introductory psychology. S-U grades optional. M W 11:15–12:05; Friday morning section TBA. D. E. Schrader.
This course surveys the nature of adolescent cognitive, social, moral, and self-development. Theories of adolescence are examined in the context of real-life experiences of adolescents using case analysis as a methodological tool. Educational implications are discussed for both formal and informal settings.

EDUC 331 Careers in Agriculture, Extension, and Adult Education
Fall. 1–3 credits. Letter grade only. F 2:00–4:25. D. E. Foster, and G. J. Applebee.
This course offers modules in three areas of teaching: Adult Education, Cooperative Extension, and Agricultural Education. Each module offers one hour of credit, and students may take one or more of the modules. The course provides an historical perspective and an introduction to the organization and scope of programs for each module. Students examine career opportunities and characteristics of the professions addressed by each module. Course activities include field observations and experiences during arranged times.

EDUC 332 Instructional Methods in AgriScience Education
Spring. 1–3 credits. Prerequisite: enrollment in a Cornell teacher education program or permission of instructor. R 2:00–4:25. C. A. Conroy.
Selection, practice, and evaluation of methods in AgriScience education are stressed. The course offers a modular approach to focus on teaching strategies and methodology unique to teaching in schools. Content includes program planning (Module I), experiential learning (Module II), and youth leadership (Module III). All students must enroll for one credit in Module I; students may be exempt from Modules II and III with permission of instructor. Participants are required to participate in field experiences at arranged times.

[EDUC 335 Youth Organizations
Spring. 3 credits. T R 10:10–11:25; lab TBA. Not offered spring 2002. Staff.
Visionary, creative, and competent leaders are essential for youth organizations. Class participants learn how to facilitate both youth and adult volunteer leadership development. They examine factors affecting membership, purposes, design, operation, and administration of youth organizations. The course provides students with indepth learning-by-doing experience of how youth organizations function. Field experience with a recognized youth organization is required.]

EDUC 370 Issues in Educational Policy
Spring. 3 credits. T R 10:10–11:25. Staff.
An examination of selected policy issues in current education. Included are such topics as equality of educational opportunity; student, parent, and teacher rights; and educational politics. Issues are treated from legal, sociological, and economic perspectives. Meets group C requirements for College of Agriculture and Life Sciences.

EDUC 378 Political Economy of Education
Fall. 3 credits. S-U grades optional. T R 1:25–2:40. Staff.
A policy oriented examination of educational systems with an emphasis on political and economic perspectives. Attention is paid to both external and internal aspects of educational activities. Specific topics include the changing contributions of education to earnings, school-community relations, power within educational organizations, the impact of technology in the workplace and in classrooms, and the sources and impact of educational costs. A variety of education settings are examined including higher education and non-formal education.

EDUC 380 Independent Honors Research in Social Science
Fall or spring. 1–6 credits. Limited to students who have met requirements for the honors program. S-U grades optional. A maximum of 6 credits may be earned in the honors program. Staff.

EDUC 401 Our Physical Environment
Fall. 3 credits. Prerequisite: permission of instructor. Charge for laboratory supplies, approximately $7. T 1:25–4:25. V. N. Rockcastle.
A practical, relatively nonmathematical study of some basic relationships and physical interactions in the environment, with emphasis on physics and earth science. Attention is paid to analysis for understanding and techniques for teaching. An individual research project is included. Useful for teachers, environmental educators, and those for whom physical science seems difficult or uninviting.

EDUC 402 Knowing and Learning in Science, Mathematics, and Agriscience
Fall. 4 credits. Prerequisite: enrollment in a Cornell teacher education program or permission of instructor. M W 2:30–4:20. D. J. Trumbull.
Students examine both current notions in the history and philosophy of science that explain how knowledge within a discipline develops and current theory and research that examines the individual's acquisition of knowledge. This material serves as a basis for students' individual research projects investigating neophytes' knowledge of science and mathematics concepts. All students enrolled must complete fieldwork. Fieldwork comprises a minimum of three hours a week in an appropriate educational setting.

EDUC 403 Observing and Teaching Science, Mathematics, and Agriscience
Spring. 4 credits. Prerequisites: EDUC 402, enrollment in a Cornell teacher education program or permission of the instructor. C. A. Conroy.
Designed for prospective secondary teachers, this course provides a multiple-perspectives orientation to the culture of schools and the work of teaching science and mathematics. Students spend six to eight hours each week observing in area schools. Students also plan and teach innovative lessons in the scheduled teaching laboratory. Includes readings and discussions planning, delivery, and evaluation of instruction classroom management, and other issues such as equity, tracking, and classroom language.

[EDUC 413 Psychology of Human Interaction
Fall. 3 credits. Enrollment limited. Prerequisite: permission of instructor. T R 10:10–12:05. Not offered 2001–2002. D. E. Hedlund.
Designed to develop skills for, and understanding of, effective interpersonal communication and interaction. Appropriate for students in the helping professions, education, and areas involving management of human resources.]

[EDUC 414 Counseling Psychology
Spring. 4 credits. Prerequisites: introductory psychology, social or personality psychology. T R 10:10–12:05. Not offered 2001–2002. D. E. Hedlund and staff.
The processes of counseling are examined from various theoretical perspectives. Typical counseling issues are examined, and implications are drawn for counseling strategies, including psychological assessment, establishing therapeutic goals, intervention strategies, and evaluation of outcomes.]

EDUC 420 Field Experience
Fall or spring. 1–4 credits. S-U grades optional. Undergraduates must attach to their course enrollment material written permission from the faculty member who will supervise the work and assign the grade. Staff.
Students may engage in planned, semiprofessional, or professional practice in an educational enterprise. Each student prepares a plan of action including rationale, purposes, and procedures and arranges with a faculty member to supervise and evaluate their field experience.

EDUC 441 Language Acquisition, Literacy, and Schooling
Spring. 4 credits. Prerequisites: education majors or permission of instructor. M W 8:40–9:55; lab, TBA. S. Kroma.
This course examines current research, policy, and practice relating to the acquisition of first and second languages, the dynamics of literacy in school contexts, and the development of academic language proficiency. Emphasis is placed on understanding the processes by which the language arts (listening, speaking, reading, and writing) progress in first and second languages, and the roles they play in academic development. Students spend two out-of-class hours a week working with learners in language acquisition or literacy development settings and undertake practical projects involving analyses of second language performance, writing, or oral reading behavior.

EDUC 445 Curriculum Design Workshop
Summer. 3 credits. G. J. Posner.
A general practical approach to course planning. Readings, group discussions, workshops, and individual conferences centering on each student's project. This project consists of designing a course in a subject area for an age level and an institutional setting of the student's choosing.

EDUC 447 Curriculum Design Laboratory: A Technology-Intensive Course
Spring or summer. 3 credits. Staff.
A project-focused introduction to course design, from needs assessment, through materials development, to the evaluation of student outcomes. The course involves the creation and implementation of an actual curriculum, and the nature of the project varies from year to year. Students are expected to make extensive use of computer software writing, design, management, and communications. The summer section of 447 is smaller and rather than working on a single class project, students undertake curriculum development projects of their own design.

EDUC 459 Education in Africa and the Diaspora (also AS&RC 459)
Fall. 3 credits (4 in CA&S). T 10:10–12:35. N. Assié-Lumumba.
This course deals with educational innovations geared to promoting equal opportunity based on gender, race, and class in Africa and the African Diaspora. After an introduction on the concepts and innovations and the stages of innovation as planned change, the course focuses on concrete cases and different types of educational innovations. The selected case studies, in the United States, include the creation and expansion of historically black institutions with a focus on Tuskegee Institute (now Tuskegee University), Lincoln University, Spelman College, and the Westside Preparatory School in Chicago. The African cases to be studied include African languages for instructing in Nigeria and science educational in Nigeria, Ujamaa and education for self-reliance in Tanzania, television as a medium of instruction and technological innovation in Côte d'Ivoire, classroom action research in Lesotho, and higher education and distance learning in South Africa.

EDUC 463 Policy Issues in Distance Learning in Developing Countries
Spring. 3 credits. S-U grades optional. T 2:00–4:25. N. Assié-Lumumba.
Distance Learning is being increasingly adopted to respond to the high demand for education in developing countries. This course critically analyzes distance education for the general population as well as specific social and professional categories. A typology of the ICTs (Information and Communication Technologies) used and the different forms of virtual learning institutions are examined.

EDUC 472 Philosophy of Education
Fall. 3 credits. T 2:30–4:25. Staff.
A study of central issues in the philosophy of education. Questions of ethics, political philosophy, and the theory of knowledge are examined and linked to current educational issues.

EDUC 477 Law and Educational Policy
Fall. 3 credits. M 2:30–4:25. Staff.
A study of recent federal court decisions concerning education. Emphasis is on examining legal issues against a background of related educational issues and in terms of the consequences of legal decisions for the development and operation of educational institutions.

EDUC 480 Global Seminar: Environment and Sustainable Food Systems (also ALS 480 and INTAG 480)
Spring. 1–3 credits. Prerequisite: juniors, seniors, and graduate students. Letter grade. Lec, R 8:00–9:55 a.m., Lab, 3:35–4:25 p.m. scheduled, one additional hour unscheduled. H. D. Sutphin, P. A. Arneson, and D. Lee.
For description, see ALS 480.

EDUC 483 Comparative Studies in Adult Education
Spring. 3 credits. S-U grades optional. T R 3:35–5:00. M. Kroma.
Focuses on the variety of adult-education programs in countries around the world. Literature on comparative adult education, international conferences on adult education, UNESCO adult-education publications, and international community development are analyzed in relationship to each student's exploration of adult education in two countries. Description of adult education in other countries is shared by international students.

EDUC 494 Special Topics in Education
Fall or spring. 4 credits maximum. S-U grades optional. Hours TBA. Staff.
The department teaches "trial" courses under this number. Offerings vary by semester, and will be advertised by the department before the semester starts. Courses offered under this number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

EDUC 495 Senior Seminar
Spring. 2 credits. Education majors or permission of instructors. S-U only. TBA. Undergraduate coordinator for the department.
This seminar focuses in depth on two or three significant educational issues, which may vary from year-to-year depending on the interests and background of students and faculty. The seminar attempts to help students relate the knowledge gained in their particular concentrations to a set of broad issues in education. While education faculty is involved in selecting the issues and providing guidance for the seminar, students are expected to provide the initiative and leadership in the classroom.

EDUC 497 Individual Study in Education
Fall or spring. 1–3 credits. S-U grades optional. Students must register with an Independent Study form (available in 140 Roberts Hall). Hours TBA. Staff.
A student may, with approval of a faculty adviser, study a problem or topic not covered in a regular course or may undertake tutorial study of an independent nature in an area of educational interest.

EDUC 498 Undergraduate Teaching
Fall or spring. 1 or 2 credits; 4 credits maximum during undergraduate career. Limited to students with GPA of at least 2.7. S-U grades optional. Students must register with an Independent Study form (available in 140 Roberts Hall). Hours TBA. Staff.
Participating students assist in teaching a course allied with their education and experience. Students are expected to meet regularly with a discussion or laboratory section, to gain teaching experience, and regularly to discuss teaching objectives, techniques, and subject matter with the professor in charge.

EDUC 499 Undergraduate Research
Fall or spring. 6 credits maximum during undergraduate career. Not open to students who have earned 6 or more undergraduate research credits elsewhere in the college. Limited to juniors and seniors with GPAs of at least 2.7. Students must register with an Independent Study form (available in 140 Roberts Hall). Hours TBA. Staff.
Affords opportunities for students to carry out independent research under appropriate supervision. Each student is expected to review pertinent literature, prepare a project outline, conduct the research, and prepare a report.

EDUC 502 Education and Development in Africa (also AS&RC 502)
Spring. 3 credits (4 in CA&S). S-U grades optional. T 2:00–4:25. N. Assié-Lumumba.
In the 1950s and 1960s, human capital theory that emphasizes the importance of formal education for achievement of full productive potential of individuals and economic growth and development of countries enjoyed a renewed popularity. African countries promoted education expansion with the expectation that it would lead to socio-economic development. The initial euphoria, however, was followed by skepticism and then disillusion. Education, as it was being organized, delivered, received, and utilized began to be perceived even as a hindrance to development. This course examines the relationship between formal education and individual and national development. Different paradigms of development, including modernization and dependency theories, and Third World Forum are examined. Issues discussed include education and schooling, the role of primary, secondary, and higher education in development, the problems of employment, language, equity in access, and results based on social class, ethnicity, race, and gender. Endogenous knowledge, new perspectives for relevant education, and the role of international organization and cooperation are also discussed.

EDUC 507 Environmental Inquiry (also NTRES 507)
Summer. 1–3 credits. S-U grades optional. Prerequisite: limited to preservice or inservice secondary science teachers. Permission of the instructor required. M. E. Krasny.
Exploration of selected topics in environmental science and environmental science education at the secondary school level. The subject-matter focus varies from year to year, and tracks ongoing research and development conducted through Cornell's Environmental Inquiry project, a collaboration between the Departments of Education and Natural Resources and the Center for the Environment. Current work centers on watershed dynamics, biodegradation, environmental toxicology, and invasive species.

EDUC 513 Interpersonal Interaction
Summer. 1–2 credits. D. E. Hedlund.
Designed to develop skills for an understanding of effective interpersonal communication and interaction. Appropriate for students in the helping professions, education, and areas involving management of human resources. A workshop design is required for the second credit. Participants must bring a tape recorder to class.

EDUC 523 Food and Fiber Across the Curriculum
Summer. 0–3 credits. J. Hawkes.
An intensive five-day course designed to help New York State elementary teachers and administrators implement the New York Agriculture in the Classroom Program and understand the complexity of New York's leading industry. Participants learn how instructional materials and experiences with our food-fiber system can be used to teach students language arts, mathematics, science, and social studies. One credit is earned by class attendance and participation. Two credits require one additional project. Three credits require two additional projects.

EDUC 548 Effective College Teaching
Spring. 1–3 credits. S-U grade option. T 5:00–7:00. D. Way.
This course is designed to help participants become more effective college teachers. It examines the basic principle of learning, identifies different learning styles, and explores a variety of teaching techniques, methods, and technologies. Participants also learn how to design a course and improve their effectiveness as teachers.

EDUC 578 International TA Training Course: Cross-Cultural Classroom Dynamics, Pronunciation and Language, Video Teaching Practicum
Fall and spring. 2 credits. S-U only. TBA. I. Arnesen, E. Burns, G. Wolek, D. Mendelson.
Designed for first-time international teaching assistants from countries in which English is not the primary language, the ITATP course focuses on three areas: cross-cultural classroom dynamics, video-teaching practicum, and language—enhancing communicative competence in English. Through small group seminars and individual conferences, the ITATP helps international TAs develop their linguistic and pedagogical skills as they gain sensitivity to the dynamics of U.S. classrooms.

EDUC 601 Secondary Agriculture, Science, and Mathematics Teaching Practicum

Fall or spring. 6 credits. Prerequisite: permission of instructor. Letter grades only. For graduate students enrolled in the Teacher Education in Science and Mathematics Program. M T W R F 8:00–3:00. C. A. Conroy, S. C. Piliero, G. J. Posner, A. Solomon, and D. J. Trumbull.

Supervised student teaching in science or mathematics at the secondary level. Program includes teaching in a local school for ten weeks.

EDUC 602 Teaching Agriculture, Science/Mathematics: Methods, Materials, Practice

Fall or spring. 9 credits. Prerequisite: concurrent enrollment in EDUC 601 or permission of instructor. M T W R F 9:00–3:00. Staff.

The course begins with full day sessions of intensive consideration of theoretical frameworks relevant to all aspects of student teaching. Assignments and a weekly seminar during the semester require students to use those theories to develop and evaluate teaching materials and practices. Students complete an extensive portfolio documenting their work.

[EDUC 606 Seminar in Science and Mathematics Education

Fall. 1 credit. S-U grades only. T 4:30–5:30. Not offered 2001–2002. Staff.

Explores topics in science and mathematics education. The focus of the seminar changes each year.]

EDUC 609 Methods for Interpretive Research

Spring. 3 credits. Prerequisite: course in research methods or measurement or permission of instructor. T R 2:55–4:10. D. J. Trumbull.

This course examines some of the methods of educational interpretive research. An interpretive research perspective attends to the complex interactions between researcher, researched, and contexts and accepts the centrality of interpretation in the conduct of human affairs. This perspective imposes some unique demands on researchers wishing to justify the quality of their projects. In the class, students practice methods for gathering and interpreting data by conducting a small project using methods as they relate to the aims and assumptions of interpretive research.

EDUC 611 Educational Psychology

Fall. 3 credits. Prerequisite: introductory psychology. S-U grades optional. M W 11:15–12:05. R. E. Ripple.

A basic survey course for graduate students (selected undergraduates admitted with permission). Emphasis is on psychological factors involved in human learning and the educational process. Set in a broad-based conceptual model of any behavioral setting for learning. A life span developmental approach is used, appropriate for those seeking an introduction to educational psychology or a refresher course in contemporary educational psychology.

EDUC 614 Gender, Context and Epistemological Development (also WOMNS 624)

Fall. 3 credits. S-U grades optional. M 12:20–2:15. D. E. Schrader.

Insight into how individuals make sense of knowledge is essential to teaching and learning. This course examines theories of intellectual development and their implications for educating students of various age groups, particularly college students. The role of reflection on thinking (metacognition) and its impact on development of thought is explored.

EDUC 615 Self and Interpersonal Development and Education (also WOMNS 625)

Spring. 3 credits. S-U grades optional. M 12:20–2:15. Offered alternate years. D. E. Schrader.

Interpersonal interactions affect teaching and learning. This course takes a life-span perspective as it explores constructive-developmental theories of self and others, the influence of gender, and how such theories explain students' understanding of their own and others' actions in educational contexts.

EDUC 620 Internship In Education

Fall or spring. 1–6 credits. S-U grades optional. Each student, before course enrollment, must obtain the approval of a faculty member who will assume responsibility for supervising the work. Staff.

An opportunity for practical experience in educational professions development.

[EDUC 621 Work-Experience Coordinator Certification Course I

Summer. 3 credits. S-U grades optional. Not offered 2001–2002. D. E. Foster.

The first of a two-course sequence designed to develop the competencies needed for certification as a coordinator of diversified cooperative work experience programs. The course focuses on the history and philosophy, types, operation, and evaluation of work-experience programs including articulation with JPTA and VESID. Field interviews are required. A prerequisite for Course II, EDUC 622.]

[EDUC 622 Work-Experience Coordinator Certification Course II

Summer. 3 credits. Prerequisite: EDUC 621 Work-Experience Certification Course I. Not offered 2001–2002. D. E. Foster.

The second course for certification as a diversified cooperative work experience coordinator combines course work and directed field experience leading to the planning, development, and approval of a work-experience program in a local educational agency. Development of a philosophy and policy statement, budget, curriculum for related instruction, annual work plan by function, promotional materials, and all program forms for Board of Education approval required.]

EDUC 630 Special Problems in Agricultural, Extension, and Adult Education

Fall or spring; may also be offered in summer. 1–3 credits. S-U grades optional. Hours TBA. Staff.

The course provides an opportunity for graduate-level study of individually selected problems and issues in agricultural, extension, and adult education.

EDUC 632 Teaching Agricultural, Extension, and Adult Education

Summer. 3 credits. Prerequisite: an introductory course in teaching methods or permission of instructor. Hours TBA. C. A. Conroy.

The focus of the course is on the selection, use, and evaluation of methods and materials for teaching. Methods for group and informal instruction are covered. Opportunity is provided for students to develop teaching competence based on their individual needs and interests. Development of self-evaluation skills is included. A class project on the development of instructional materials is required.

EDUC 633 Program Planning in Agricultural, Extension, and Adult Education

Spring. 3 credits. S-U grades optional. Lec, R 2:00–5:00. A. Wilson.

Current social and economic conditions affecting agricultural, extension, and adult education are examined. Principles, objectives, strategies, and sources of information are applied to program planning. Participants have an opportunity to observe ongoing programs in agricultural, extension, and adult education and to pursue individual interests in program development and improvement.

[EDUC 635 Experiential Learning

Fall. 2 credits. Prerequisite: open to undergraduates with permission of instructor. S-U grades optional. T 12:20–2:15. Not offered 2001–2002. Staff.

Participants explore various dimensions of scholar and practitioner thinking about the understanding and practice of experiential learning. Theoretical perspectives on experiential education, reflective practice, and a critical learning systems perspective are explored through readings and applied assignments. The instructor introduces methods of facilitation designed to encourage inquiry and dialogue for improvement of both nonformal and formal educational activities. The course process is intended to engage participants in reflective dialogue—nurturing emergence of learning community elements.]

[EDUC 644 Curriculum Theory and Analysis

Spring. 3 credits. M 1:25–4:25. Not offered 2001–2002. G. J. Posner.

An examination of the basic elements involved in making curriculum decisions and an analysis of current approaches to curriculum. The course focuses on the assumptions underlying any curriculum. The major task of each student is to choose and conduct an in-depth analysis of a curriculum. This course is the basic graduate course in curriculum.]

EDUC 661 Administration of Educational Organizations

Fall. 3 credits. R 3:35–6:00. J. W. Sipple.

Perspectives on the administration of educational organizations. Consideration of social science, legal and ethical theories, and their application to both public schools and higher education. Intended for students who are considering careers as educational administrators, as well as for those who want to further their understanding of educational organizations.

[EDUC 664 Educational Finance
Fall. 3 credits. S-U grades optional. W 3:35–6:00. Not offered 2001–2002. Staff.
An analysis of the distribution and use of public and private resources for educational purposes. Discussion revolves around the issues of equity, efficiency, and freedom of choice. Alternative methods of financing schools are evaluated, and the perplexing legal and moral issues raised by such questions as "Who pays?" and "Who benefits?" are discussed. Specific attention is given to budgeting, accountability, and productivity. An opportunity for individuals to focus on their own areas of interest, such as occupational education, the two-year college, or secondary or higher education.]

EDUC 665 Administrative Decision Making
Spring. 3 credits. S-U grades optional. W 3:35–6:00. Staff.
An introduction to decision-making theory and its relevance to the field of educational administration. Specific applications are made to the study and improvement of productivity in educational systems. A wide variety of educational settings are considered, including K-12, higher education and nonformal education.

EDUC 680 Foundations of Extension Adult Education
Fall. 3 credits. Limited to 20 students. S-U grades optional. R 3:35–6:00. A. Wilson.
An analysis of alternative purposes, nature, and scope of extension, adult, and continuing education programs in the United States and abroad, with emphasis on the relationship of programs to historical, cultural, political, and social settings. Definitions, conceptual controversies, philosophical issues, and current research directions are examined through a seminar approach.

EDUC 682 Community Education and Development
Fall. 3 credits. Limited to 25 students. Letter grade only. M 1:25–4:25. S. Peters.
An examination of the concept of community; changes in community life; the analysis of community; alternative strategies for community development; patterns of response to community by universities, colleges, schools, cooperative extension, and government service agencies; and such functional dimensions of community education programming as participatory decision making, volunteers, leadership development, council formation and function, interagency coordination, and change-agents roles.

EDUC 685 Training and Development: Theory and Practice (also COMM 685, INTAG 685)
Spring. 4 credits. S-U grades optional. F 9:05–12:05; lab TBA. M. Kroma.
Analysis, design, conduct, administration, and evaluation of training programs for the development of human resources in small-farm agriculture, rural health and nutrition, literacy and nonformal education, and general community development. Designed for scientists, administrators, educator-trainers, and social organizers in rural and agricultural development programs in the United States and abroad.

EDUC 694 Special Topics in Education
Fall, spring, or summer. 1–3 credits. Prerequisite: permission of instructor. S-U grades optional. Hours TBA. Staff.
Topics to be announced.

EDUC 711 Contemporary Issues in Educational Psychology
Fall and spring. Variable, 3 credits. TBA. Staff.
This is a graduate-level seminar dealing with key issues in contemporary psychology having implications for educational practice and research. Topics vary from semester to semester. Students may take the course more than once.

[EDUC 714 Moral Development and Education
Spring. 3 credits. S-U grades optional. M 12:20–2:15. Offered alternate years. Not offered 2001–2002. D. E. Schrader.
This seminar focuses on current topics in moral development research as related to the educational process. Topics include the question of the development of moral reasoning, gender differences, the relationship between moral judgment and moral action, questions related to moral education in secondary schools and university settings, and professional ethics in educational settings. This course takes a life-span perspective; however, special emphasis is placed on development from adolescence through adulthood.]

EDUC 718 Adult Learning and Development
Spring. 3 credits. Prerequisite: permission of instructor. S-U grades optional. W 2:00–4:25. A. Wilson and R. E. Ripple.
Deals with adult development and learning behavior from points of view of educational psychology and adult education. Inferences are drawn from theory and research to the practice of adult continuing education. Appropriate for graduate students in educational psychology, extension and continuing education, and community service education, and for others interested in adult learning and development.

EDUC 730 Seminar in Agricultural, Extension, and Adult Education
Spring. 3 credits. S-U grades optional. R 8:00–9:55. S. Peters.
Emphasis is on current problems and research in agricultural, extension, and adult education. Includes discussion and analysis of student and staff research.

[EDUC 745 Seminar in Curriculum Theory and Research
Fall. 3 credits. Prerequisite: EDUC 644, or permission of instructor. Not offered 2001–2002. T 2:30–5:00. G. J. Posner.
Theoretical issues in curriculum and appropriate areas for curriculum research are discussed. Two current topics of interest are the hidden curriculum and school reform. Both topics serve to uncover the relation between ideology and research.]

EDUC 760 Practicum Seminar in Educational Administration
Fall, spring, and summer. 2 credits. S-U only. Hours TBA. J. W. Sipple.
The practicum seminar is taken in conjunction with the administrative internship and serves to tie together previous coursework, current policy issues, and the concurrent internship. It involves two elements. First, current interns meet regularly during the semester to bring their knowledge base (developed in the program) to bear on their current duties and problems and collaboratively problem solve with faculty and other interns. Second, interns participate in special topics seminars as needed in order to supplement coursework in critical areas. Examples of special topics are AIDS, sexual harrassment in the workplace, child abuse, and substance abuse recognition.

EDUC 761 Internship in Educational Administration
Fall, spring, and summer. 9 credits. S-U only. Hours TBA. G. Posner and J. W. Sipple.
The internship experience provides aspiring administrators with supervised professional activities in a public school district. Students undertaking an internship in Educational Administration (1) learn the practical day-to-day skills of school administration under the supervision of an on-site administrator, and (2) conceptualize and execute a research project dealing with an issue of interest to the participating school district and the student's special committee. Students work in collaboration with their special committee and on-site supervisor to integrate educational theory and the field experience. A minimum of 20 hours per week are devoted to on-site internship duties. Students enroll concurrently in EDUC 760 (practicum seminar) to complete additional degree and certification requirements.

EDUC 762 Comparative Educational Systems
Fall. 3 credits. S-U grades optional. M 10:10–12:35. N. Assie-Lumumba.
This seminar critically analyzes education conceived both as a universal social institution and a reflection of cultural, economic, and political dynamics of the local and global contexts. The analysis focuses on policies, organization, and the functioning of education in industrial, new/emerging economies and developing countries. Specific case studies are drawn from different countries.

EDUC 783 Farmer-Centered Research and Extension (also INTAG 783)
Fall. 3 credits. S-U option. M. Kroma.
This course provides an introduction to participatory traditions in farming systems research, extension, evaluation of rural development, technology generation, gender analysis, participatory rural appraisal, and documentation of local and indigenous knowledge of community-based development. Case studies of farmer-centered research and extension provide a focus for analysis. Appropriate roles of researchers and extensionists as partners with farmers are examined. A major contribution of farmer-centered research and extensions is its potential to legitimize people's knowledge by enhancing their capacity to critically analyze their own problems, to conduct their own research, and to empower them to take direct action to solve those problems.

EDUC 800 Master's-Level Thesis Research
Fall or spring. Credit TBA. S-U grades optional. Each student, before course enrollment, must obtain the approval of a faculty member who will assume responsibility for guiding the work. Hours TBA. Staff.

EDUC 900 Doctoral-Level Thesis Research
Fall or spring. Credit TBA. Limited to students working on theses or other research and development projects. S-U grades optional. Each student, before

course enrollment, must obtain the approval of a faculty member who will assume responsibility for guiding the work. Hours TBA. Staff.

ENTOMOLOGY

D. A. Rutz, chair; A. M. Agnello, M. C. Caillaud, N. W. Calderone, B. N. Danforth, G. M. English-Loeb, J. Ewer, P. P. Feeny, C. Gilbert, A. E. Hajek, L. C. Harrington, M. P. Hoffmann, J. K. Liebherr, J. E. Losey, J. P. Nyrop, B. L. Peckarsky, D. Pimentel, L. S. Rayor, R. B. Root, J. P. Sanderson, J. G. Scott, A. M. Shelton, E. J. Shields, W. M. Tingey, M. Villani, P. A. Weston, Q. D. Wheeler

Courses by Subject

Apiculture: 260, 264
Behavior: 215, 325, 394, 471, 662
Ecology: 452, 455, 456, 470, 471, 672
Introductory courses: 201, 212, 215
Medical entomology and veterinary entomology: 352
Morphology: 322
Pathology: 463
Pest management: 241, 277, 441, 443, 444, 477, 644
Physiology, development and toxicology: 370, 394, 400, 483, 490, 685
Systematics: 331, 453, 631, 632, 634, 635

Note: class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

ENTOM 201 Alien Empire: Bizarre Biology of Bugs
Spring. 2 credits. Limited to 100 students. S-U grades optional. Lecs, T R 9:05; optional field trips, required lab demonstrations. Offered alternate years. B. N. Danforth.
Insects are the most abundant and diverse animals on earth. This course explores the bizarre biology of insects by examining their evolutionary history, anatomy, development, feeding habits, life-history strategies, behavior, and their interactions with humans (both positive and negative) through history. Optional field trips and one open lab provide hands-on opportunities for examining these amazing animals.

ENTOM 212 Insect Biology
Fall. 4 credits. Prerequisites: BIO G 101–102 (may be taken concurrently) or equivalent. Lecs, W F 10:10–11:00; labs T W or R 1:25–4:25. Lab fee $35. C. Gilbert.
Introduces the science of entomology by focusing on basic principles of systematics, morphology, physiology, behavior, and ecology of insects. The laboratory in early fall includes field trips to collect and study insects in the natural environment. A collection emphasizing ecological, behavioral, and taxonomic categories is required.

ENTOM 215 Spider Biology: Life on a Silken Thread
Fall. 2 credits. Prerequisite: introductory biology or permission of instructor. S-U grades optional. Lecs, W F 1:25–2:15. L. S. Rayor.
An introduction to the fascinating world of spiders. Evolution, ecology, behavior, and physiology of spiders and their close kin are explored from a modern perspective. Topics include identification of major spider families, spiders' unique use of silk, risky courtship, predatory behavior, diverse life styles, social spiders, and potential use in IPM.

ENTOM 241 Applied Entomology
Spring. 3 credits. Prerequisites: BIO G 101–102 or equivalent. Lecs, T R 10:10; lab/disc, T or W 12:20–3:15. W. M. Tingey.
Introduction to major pest species and tactics for their management. Discussions of insect pest management requirements on farms, gardens, forests, and urban environments, along with descriptions of control methods, materials, and equipment.

ENTOM 260 Introductory Beekeeping
Fall. 2 credits. Lecs, T R 11:15. N. W. Calderone.
Introduces students to the life history, physiology, and behavior of honey bees, as well as to the fundamentals of practical beekeeping. Classical and contemporary research on the dance language, chemical communication, behavioral genetics, division of labor, and evolution of social behavior are reviewed. Lectures on pollination of agricultural crops, honey and beeswax, bees in ancient and modern rituals, Africanized honey bees, and insect politics are also included.

ENTOM 264 Practical Beekeeping
Fall. 1 credit. Limited to 20 students. Prerequisite: ENTOM 260 (may be taken concurrently). Lab, R 2–4:25. N. W. Calderone.
This course consists of 14 laboratory sessions that acquaint students with practical methods of colony management. Laboratories involve hands-on work with honey bee colonies and equipment. Some of the topics covered include management of bees for apple pollination, honey harvesting and processing, and disease identification/control. The class makes a number of field trips to commercial beekeeping operations. Students conduct simple experiments to demonstrate color perception by bees, as well as the chemical basis for swarming, nest guarding, and mating.

[ENTOM 277 Natural Enemies Managing Pests: An Introduction to Biological Control
Spring. 2 credits. S-U grades optional. Lecs, T R 1:25–2:15; lab demonstration; optional field trip. Offered alternate years. Not offered spring 2002; next offered spring 2003. A. E. Hajek.
An introduction to the dynamic field of biological control. What is it and when should it be used? This course covers a diversity of types of biological control including use of parasitoids, predators, pathogens, and competitors as well as plant breeding to control pests from microbes to weeds to invertebrates and vertebrates. This course is intended for students curious about safely controlling pests.]

[ENTOM 322 Comparative Insect Morphology
Spring. 5 credits. Prerequisite: ENTOM 212 or 241. Lecs, M W F 9:05; labs, M W 1:25–4:25. Offered alternate years. Not offered spring 2002; next offered spring 2003. B. N. Danforth.
This course provides a detailed introduction to the external and internal anatomy of insects. Lectures introduce basic concepts in insect morphology, such as the organization of the insect body plan and organ systems, functional morphology, homology, phylogeny, modularity, and development. The laboratory portion of the course introduces students to the basic methods of insect microdissection, specimen preparation, and scientific illustration. High-quality, publishable illustrations are produced based on student art-work.]

[ENTOM 325 Insect Behavior
Spring. 3 credits. Prerequisites: introductory biology or introductory entomology or permission of instructor. Lecs, M W F 12:20. Offered alternate years. Not offered spring 2002; next offered spring 2003. L. S. Rayor.
Insects are the most diverse organisms on earth, with equally diverse behavior. This course explores the behavior of insects, ranging from the individual sensory and physiological mechanisms that are the basis of insect behavior, to the behavioral dynamics of foraging, courtship, parental care, and social behavior. Topics include insect learning, perceptual abilities, host finding strategies, predation, pollination, and examination of current issues in insect behavior.]

ENTOM 331 Introductory Insect Systematics
Fall. 4 credits. Prerequisite: ENTOM 212. Lecs, T R 12:20; labs, T R 1:25–4:25. Lab fee $50. Offered alternate years. C. J. Marshall.
An introduction to the classification, evolutionary history, and distribution of the insects. Laboratory practice in the identification of orders, families, and representative genera of insects; methods of collection, preservation, and study. Lectures on theory and practice of insect systematics and major features of insect evolution. Insect collections are required.

[ENTOM 370 Pesticides, the Environment, and Human Health (also TOX 370)
Fall. 2 credits. Prerequisites: BIO G 101–102 or equivalent. Lecs, T R 9:05. Offered alternate years. Not offered fall 2001; next offered fall 2002. J. G. Scott.
A survey of the different types of pesticides, their uses, properties, and effects on the environment. Discussion of the risks, benefits, regulation, politics, and current controversies associated with pesticide use.]

ENTOM 394 Circadian Rhythms (also BIOGD 394 and BIONB 394)
Fall. 2 credits. Prerequisite: ENTOM 212, or BIOGD 281, or BIONB 221 or 222, or permission of instructor. S-U grades optional. Lec, W 7:30–9:10 P.M. Offered alternate years. J. Ewer.
This course explores the neural, endocrine, and molecular mechanisms by which organisms "keep time," and how their clocks are synchronized with the planet's 24 hour light and temperature cycles. The course leans heavily on the knowledge obtained from the analysis of rhythms in insects, especially *Drosophila*, but also includes an in-depth analysis of circadian rhythms in other organisms, from cyanobacteria to mammals.

ENTOM 400 Insect Development (also BIOGD 402)
Spring. 4 credits. ENTOM 212 or BIOGD 281 or permission of instructor. S-U grades optional. Lecs, M W 11:15; lab, M 12:20–3:20; disc, F 11:15–12:05. Offered alternate years. J. Ewer.
The course emphasizes the mechanisms that underlie embryonic and post-embryonic developmental processes of insects. The portion of the course on embryonic develop-

ment leans heavily on knowledge obtained from *Drosophila*, but also covers more classical studies as well as recent advances exploring the molecular basis for the evolution of body plan. The post-embryonic development portion covers the control of growth, molting, and metamorphosis. The laboratory uses modern techniques to illustrate developmental events at the organismal and cellular level. The discussion section involves the analysis and presentation of primary research papers.

[ENTOM 441 Seminar in Insect Pest Management

Spring. 1 credit. Limited to 15 students. Prerequisite: ENTOM 241 or 444 or permission of instructor. S-U grades only. Hours TBA. Offered alternate years. Not offered spring 2002; next offered spring 2003. M. P. Hoffmann and A. M. Shelton.

Discussion and analysis of current topics in insect pest management.]

[ENTOM 443 Entomology and Pathology of Trees and Shrubs (also PL PA 443)

Fall. 4 credits. Prerequisites: ENTOM 212 or equivalent and PL PA 241 or equivalent. S-U grades optional. Evening prelims. Lecs, M W F 11:15; lab, F 1:25-4:25. Offered alternate years. Not offered fall 2001; next offered fall 2002. P. A. Weston and G. W. Hudler.

For students preparing for careers in horticulture, urban forestry, pest management, and natural history/science education. Deals with the nature, diagnosis, assessment, and management of insect and disease pests on trees and shrubs in forests, urban landscapes, Christmas tree plantations, and other sites where intensive pest management is practiced.]

ENTOM 444 Integrated Pest Management (also PL PA 444)

Fall. 4 credits. Prerequisites: BIOEE 261, ENTOM 212 or 241, and PL PA 241 or their equivalents or permission of instructor. Lecs, M W F 9:05; labs, M 1:25–4:25. P. Arneson and J. Losey.

Lectures integrate the principles of pest control, ecology, and economics in the management of pests across multiple systems. Laboratories consist of exercises to reinforce concepts presented in lecture and demonstrate pest monitoring techniques and the application of computer technology to management problems.

[ENTOM 452 Herbivores and Plants: Chemical Ecology and Coevolution (also BIOEE 452)

Spring. 3 credits. Prerequisites: 1 year of introductory biology; BIOEE 261; CHEM 257 or 357/358 and 251 or 301; or permission of instructor. Lecs, M W F 11:15. Offered alternate years. Not offered spring 2002; next offered spring 2003. P. P. Feeny.

Significance of plant chemistry in mediating interactions between plants and herbivorous animals; mechanisms and strategies of plant finding and exploitation by animals, especially insects, and of defense and escape by plants; evolutionary hypotheses for ecological patterns of resistance and attack; implications for human food and agriculture.]

ENTOM 453 Principles and Practice of Historical Biogeography (also BIOPL 453)

Fall. 3 credits. Prerequisite: a course in systematics or permission of instructors. S-U grades optional. Lecs, T R 10:10; lab T 1:25–4:25. Offered alternate years. J. K. Liebherr and M. Luckow.

A survey of techniques in historical biogeography, and the development of modern biogeographic theory in the context of classical, ecological, and phylogenetic analytical methods. Geological and paleontological aspects of biogeography are presented, and large-scale biogeographic patterns discussed. Laboratories focus on computer applications and discussion of controversial issues.

ENTOM 455 Insect Ecology (also BIOEE 455)

Fall. 3 credits. Prerequisites: BIOEE 261 or equivalent and ENTOM 212 or equivalent knowledge of another taxon. S-U grades optional. Lecs, M W F 11:15. Offered alternate years. R. B. Root.

Topics include the nature and consequences of biotic diversity, biogeography, coevolution, adaptive syndromes exhibited by various guilds, population regulation, impact of insects on ecosystems, comparative and functional analysis of communities, and differences in the organization of natural and managed systems. Ecological and evolutionary principles are integrated by thorough study of exemplars.

[ENTOM 456 Stream Ecology (also BIOEE 456 and NTRES 456)

Spring. 4 credits. Limited to 60 students. Recommended: BIOEE 261. S-U grades optional. Lecs, T R 9:05; labs, T W or R 1:25–4:25. Offered alternate years. Not offered spring 2002; next offered spring 2003. B. L. Peckarsky.

Lecture addresses the patterns and processes occurring in stream ecosystems, including channel formation, water chemistry, watershed influences, plant, invertebrate, and fish community structure, nutrient cycling, trophic dynamics, colonization and succession, community dynamics, conservation, and the impacts of disturbances. Lab: field projects include descriptive and experimental techniques, hypothesis testing and writing of scientific papers related to environmental assessment.]

ENTOM 463 Invertebrate Pathology

Spring. 4 credits. Prerequisites: one year of introductory biology. S-U grades optional. Lecs, M W F 9:05; lab, W 1:25–4:25. Offered alternate years. A. E. Hajek.

Lecture presents principles of pathology as applied to invertebrates. Topics explored include noninfectious and infectious diseases caused by viruses, bacteria, fungi, protozoa, and nematodes, epizootiology of insect diseases, and use of pathogens for control. Laboratory involves a diversity of pathogens and hosts using techniques such as microinjection, electrophoresis, immunoassay, density gradient centrifugation, soil extraction, and computer simulation.

[ENTOM 470 Ecological Genetics

Spring. 3 credits. Prerequisites: BIOEE 278 or permission of instructor. S-U grades optional. Lecs, T R 10:10; disc, 1 hr/wk TBA. Offered alternate years. Not offered spring 2002; next offered spring 2003. Staff.

A study of the genetic basis and evolution of ecologically important traits. Blending theory with an experimental approach to study evolution in nature, the course includes methods for measuring genetic variation and natural selection; biometrical and molecular analysis of genetic architecture; constraints and limits on evolution in natural populations; genetic aspects of coevolution, phenotypic plasticity, and conservation of endangered species. Examples are taken from studies of animals and plants.]

ENTOM 471 Freshwater Invertebrate Biology and Biomonitoring

Spring. 5 credits. Recommended: ENTOM 212. S-U grades optional. Lecs, T R 9:05; labs, T R 1:25–4:25. Offered alternate years. B. L. Peckarsky.

Lecture explores the morphology, physiology, phylogeny, life histories, behavior, feeding ecology, and evolution of macroscopic freshwater invertebrates with an emphasis on contrasting the attributes of aquatic and terrestrial insects. Laboratory involves field collections and identification of invertebrates and stresses the use of taxonomic keys. Students prepare a collection of freshwater invertebrates or conduct a project using freshwater invertebrates to biomonitor stream habitat quality.

[ENTOM 477 Biological Control

Fall. 3 credits. Prerequisites: ENTOM 212, BIOEE 261, and permission of instructor. Lecs, T R 9:05; lab T 1:25–4:15. Offered alternate years. Not offered fall 2001; next offered fall 2003. Staff.

Approach and procedures in biological control of arthropod pests and weeds. Demonstrations focus on living parasitoids and predators. Discussions focus on case histories.]

[ENTOM 483 Insect Physiology

Fall. 5 credits. Prerequisite: ENTOM 212 or permission of instructor. Lecs, M W F 11:15; lab W 1:25–4:25 and a disc, TBA. Offered alternate years. Not offered fall 2001; next offered fall 2002. C. Gilbert.

An introduction to the often unique ways in which insects have met their basic needs. Each organ system is examined with emphasis on basic principles and specific examples. Students are also introduced to some common methods used in physiological research and to the critical reading of scientific literature.]

[ENTOM 490 Toxicology of Insecticides (also TOX 490)

Spring. 4 credits. Prerequisites: general chemistry. S-U grades optional. Lecs, M W F 9:05; disc 1:25–2:15, day TBA. Offered alternate years. Not offered spring 2002; next offered spring 2003. J. G. Scott.

The history, metabolism, and mechanism of action of synthetic and naturally occurring insecticides. Mechanisms of insecticide resistance, evaluation of insecticide toxicity, and new approaches to insect control with biotechnology are discussed.]

ENTOM 494 Special Topics in Entomology

Fall or spring. 4 credits maximum. S-U grades optional. Hours TBA. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not be offered more than twice under this number.

ENTOM 497 Individual Study in Entomology
Fall or spring. Credit TBA. Prerequisite: permission of instructor. Students must register with an Independent Study form (available in 140 Roberts Hall). Staff.

ENTOM 498 Undergraduate Teaching
Fall or spring. Credit TBA. Prerequisite: permission of instructor. Undergraduate teaching assistance in an entomology course by agreement with the instructor. Students must register with an Independent Study form (available in 140 Roberts Hall). Staff.
Participating students assist in teaching a course allied with their education and experience. Students are expected to meet regularly with a discussion or laboratory section, to gain teaching experience, and regularly to discuss teaching objectives, techniques, and subject matter with the professor in charge.

[ENTOM 631 Systematics of the Coleoptera
Summer. 3 credits. Limited to 18 students. 3 week summer session. Prerequisites: an introductory course in insect taxonomy and permission of instructor. Labs, M T W R F 9–4; Saturday field trips. Offered alternate years. Not offered 2001; next offered 2002. Q. D. Wheeler.
A comprehensive review of the comparative morphology, phylogenetic relationships, classification, natural history, and distribution of the Coleoptera, including adult and immature stages. Laboratory practice in identification and methods for collection and study of beetles. A collection is required.]

[ENTOM 632 Advanced Coleopterology
Summer. 1–3 credits. Prerequisite: permission of instructor. S-U grades optional. Lab, TBA. Offered alternate years. Not offered 2001; next offered 2002. Q. D. Wheeler.
An advanced course on the phylogeny and classification of selected subclades of Coleoptera. Laboratory exercises in identification of beetles, generally to the level of genus or beyond. Taught by authority on taxon of interest, frequently including a visiting scholar. Can be repeated for credit.]

ENTOM 634 Special Topics in Systematic Entomology
Fall or spring; taught on demand. 2–4 credits. Prerequisite: permission of instructor. Staff.
Lectures on the classification, evolution, and bionomics of selected taxa, with accompanying laboratory studies on identification and comparative morphology. Collections sometimes required.

[ENTOM 635 Insect Molecular Systematics
Spring. 2 credits. Prerequisites: permission of instructor. Offered alternate years. Not offered spring 2002; next offered spring 2003. TBA. Limited to 6 students. B. N. Danforth.
Analysis of DNA sequence variation can provide a powerful tool for resolving problems in insect systematics, from species level taxonomic decisions to higher level (ordinal) relationships. This course introduces students to the basic methods of insect molecular systematics, including DNA extraction, gel electrophoresis, PCR, DNA purification, and DNA sequencing (manual and automated). Results are analyzed using available computer programs. Students are encouraged to collect preliminary data for thesis or post-doctoral research.]

ENTOM 644 Advanced IPM: Theory and Implementation
Spring. 1–4 credits. S-U grades optional. Lecs, M W F 10:10. Coordinator: J. E. Losey.
This advanced course in integrated pest management (IPM) is comprised of a rotating series of four-week intensive modules on specialized topics. Topics range from basic ecology and genetics of pests and their natural enemies to specific strategies for pest management implementation. The course is designed to provide advanced IPM instruction for graduate and upper-level undergraduate students with intermediate backgrounds in IPM. In special cases, students with little or no background in IPM seeking intensive instruction on a specialized topic may enroll with permission of the instructor. Each module is a unique unit and students may take any or all modules each time the course is offered. Prerequisites and grading procedures are determined by the instructor(s) of each module. Potential modules include: Insecticide resistance and resistance management—J. Scott: Entomology (Ithaca); Crop protection decision making—J. Nyrop: Entomology (Geneva); Economics of pest management—Staff: AEM; Greenhouse and Floriculture IPM—J. Sanderson: Entomology (Ithaca); IPM in fruit systems—A. Agnello, G. English-Loeb: Entomology (Geneva); Genetics in managed ecosystems—M. C. Caillaud: Entomology (Ithaca); Turf-grass insect IPM—M. Villani: Entomology (Geneva); Insect vectors of plant pathogens—Staff; IPM of soil-dwelling arthropods—M. Villani: Entomology (Geneva); Integrated weed and insect pest management—C. Mohler: Ecology & Evolutionary Biology; IPM implementation and extension—M. Hoffmann, J. Sanderson: Entomology (Ithaca); Plant resistance—Staff: Entomology, Plant Breeding; Integrated Pest Management in Tropical Agriculture—P. Arneson: Plant Pathology (also PL PA 655); IPM of natural systems—B. Blossey: Natural Resources; and Sustainable strategies for pest management—Staff.

[ENTOM 662 Insect Behavior Seminar
Spring. 2 credits. Prerequisites: permission of instructor and ENTOM 212 and BIONB 221 or equivalents. S-U grades optional. Offered alternate years. Not offered spring 2002; next offered spring 2003. Hours TBA. Staff.]

[ENTOM 672 Seminar in Aquatic Ecology
Spring. 1 credit. Prerequisites: permission of instructor or either ENTOM 456, 471, or BIOEE 261, 462. S-U grades optional. Hours TBA. Offered alternate years. Not offered spring 2002; next offered spring 2003. B. L. Peckarsky.
Discussion and analysis of current topics in the ecology of streams, lakes, and marine ecosystems, including student-generated synthesis of key papers in the literature. Generally appropriate for graduate students only. Interested undergraduates must contact the instructor.]

[ENTOM 685 Seminar in Insect Physiology
Spring. 1 credit. S-U grades optional. Prerequisite: permission of instructor. Offered alternate years. Not offered spring 2002; next offered spring 2003. Hours TBA. C. Gilbert.]

ENTOM 707 Individual Study for Graduate Students
Fall or spring. Credit TBA. Prerequisite: permission of instructor. Not for thesis research. Staff.

ENTOM 709 Teaching Entomology
Credit TBA. Staff.
Teaching entomology or for extension training.

ENTOM 767 Current Topics in Entomology
Fall. 1 credit. Required of graduate students pursuing a degree in the Field of Entomology. Lecs and disc, TBA. Staff.
This course provides lectures, readings and discussion to introduce first-year graduate students to the research activities of faculty in the Graduate Field of Entomology. Class meets weekly for one hour.

ENTOM 800 Master's-Level Thesis Research
Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Staff.

ENTOM 900 Doctoral-Level Thesis Research
Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Staff.

Jugatae Seminar
Fall and spring.
A seminar conducted by Jugatae, the entomology club of Cornell University, to discuss topics of interest to its members and guests. All interested undergraduate and graduate students are encouraged to attend.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

See Horticulture.

Freehand Drawing and Scientific Illustration

Freehand Drawing and Scientific Illustration courses are offered through the Department of Horticulture and are described in the section "Freehand Drawing and Scientific Illustration."

FOOD SCIENCE

D. D. Miller, chair; T. E. Acree, D. K. Bandler, D. M. Barbano, C. A. Batt, K. J. Boor, M. C. Bourne, J. W. Brady, D.P. Brown, J. M. Brown, R. B. Gravani, T. Henick-Kling, J. H. Hotchkiss, H. T. Lawless, C. Y. Lee, R. H. Liu, S. J. Mulvaney, J. M. Regenstein, S. S. H. Rizvi, J. S. Roberts, K. J. Siebert, M. Wiedmann.

Note: class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

FOOD 101 Science and Technology of Foods
Fall. 1 credit. S-U grades only. M 1:25–2:15. J. H. Hotchkiss and staff.
This course explores the application of science and technology to foods. Lectures will elucidate the role of engineering, biotechnology, chemistry, biochemistry, nutrition, toxicology, and microbiology in supplying the world with safe and nutritious food. An overview of food science as a discipline and career choice is given.

FOOD 102 Exploring Food Processing
Spring. 1 credit. S-U grades only. F 12:20. 5 field trips, 1 on F 12:30–2:30 and 4 on F 12:30-5:30. D. P. Brown.
A series of seminars on current technological and regulatory developments in food science. Field trips to four commercial food manufacturing/processing plants and one food research organization are used to illustrate the application of current technologies. A course project, using the Food Science Alumni Network, is required.

FOOD 150 Food Choices and Issues
Spring. 2 credits. S-U grades optional. T R 12:20. R. B. Gravani and D. D. Miller.
This course provides Cornell students with the knowledge needed to make healthy food choices. Topics include the U.S. food system; relationships between diet and health; food processing; food safety; and discussions of contemporary issues relating to food quality, safety, and nutrition. Students assess the nutritional quality of their personal diets and learn how to make changes to improve their diets.

FOOD 200 Introductory Food Science
Fall. 3 credits. Prerequisite: college-level courses in chemistry and biology. M W F 11:15–12:05. J. H. Hotchkiss.
A comprehensive introduction to the principles and practice of food science and technology. Topics include: chemistry of foods; nutritional significance; food formulation, preservation, and processing; microbiology and fermentations; composition and processing of food commodities; and contemporary issues including food safety, regulation, and world food needs. Interrelationships between the chemical, physical, nutritional, and quality properties of foods as affected by formulation, processing, and packaging are stressed.

FOOD 210 Food Analysis
Spring. 3 credits. Prerequisite: CHEM 208 or equivalent. Lecs, W F 1:25–2:15; lab, M 12:20–3:20. R. H. Liu and J. M. Brown.
Introduces basic analytical techniques for food analysis and other biological analysis. Emphasizes fundamental principles of analytical chemistry, basic laboratory techniques, and modern instrumental methods. Gravimetric, volumetric, and spectrophotometric methods; gas chromatography (GC); high-performance liquid chromatography (HPLC); infrared spectra (IR); and atomic absorption spectrometry are discussed.

FOOD 250 Kosher and Halal Food Regulations
Spring. 2 credits. Sophomore standing and above. M 7:30–9:25 P.M. J. M. Regenstein.
A comprehensive introduction to kosher and halal foods in the American food industry with some coverage of home practices. The kosher food laws, their origin, and their application in modern food processing are examined. The nature of the kosher supervision industry in America is described. Halal laws are also examined and the interactions between the two communities explored. Current food-related issues in both communities are reviewed, including recent court decisions. Some aspects of ethnic foods are also considered.

FOOD 290 Meat Science (also AN SC 290)
Fall. 2 or 3 credits. Lecs, T R 11:15; lab M or R 12:20–3:20. Lab cannot be taken without lecture. D. E. Shaw.
An introduction to meat science through a study of the structure, composition, and function of muscle and its conversion to meat. Properties of fresh and processed meat, microbiology, preservations, nutritive value, inspection, and sanitation are also studied. Laboratory exercises include anatomy, meat-animal slaughter, meat cutting, wholesale and retail cut identification, processing, inspection, grading, quality control, and meat merchandising. An all-day field trip to commercial meat plants is taken.

FOOD 321 Food Engineering Principles
Fall. 3 credits. Prerequisites: FOOD 200 and introductory physics. M W F 9:05–9:55. S. S. H. Rizvi.
Introduces the engineering principles underlying food processes and equipment. Topics covered include thermodynamics, mass and energy balance, fluid mechanics, heat and mass transport, and refrigeration and psychrometrics.

FOOD 351 Milk Quality
Fall. 1 credit. Prerequisite: AN SCI 250 or equivalent or permission of instructor. F 12:20. M. Wiedmann.
This course focuses on the effects of on-farm and animal husbandry practices on milk and dairy food quality and safety. Significant parts of class focus on discussion and critical analysis of the assigned reading materials, questions, and hot topics.

FOOD 394 Applied and Food Microbiology (also BIOMI 394)
Fall. 2–3 credits. Prerequisites: BIOMI 290–291. M W F 12:20–1:10. C. A. Batt.
Microorganisms play a central role in a variety of food, agricultural, and environmental processes. This course presents a comprehensive survey of the roles that microorganisms play in industrial/biotechnological processes as well as their importance in the safety and production of foods. Issues related to the biochemistry, genetics, and physiology of microorganisms important in these processes are reviewed. A two-credit core section on food microbiology is complemented by a one-credit section on industrial/biotechnology applications.

FOOD 395 Food Microbiology Laboratory
Fall. 2 credits. Prerequisite: BIOMI 291 or equivalent. M W 2:00–4:25. J. M. Brown.
Work includes study of the physiological characteristics of representative food microorganisms, practice in using general and rapid methods for microbiological testing and control of food products, and practice in the application of a systematic approach to controlling the safety of foods, or addressing a food safety issue.

[FOOD 396 Food Safety Assurance
Spring. 2 credits. Prerequisite: MICRO 290 or permission of instructor. T R 9:05–9:55. Offered alternate years. Not offered 2002, 2004, next offered spring 2003. R. B. Gravani.
This course provides information on procedures to control biological, chemical, and physical hazards and assure the safety of foods. Topics include discussions on the Hazard Analysis Critical Control Point (HACCP) concept, good manufacturing practices, prerequisite programs, and the application of current technologies in reducing the risk of foodborne illnesses. Case studies and exercises are used to demonstrate and apply the key principles that are discussed.]

FOOD 400 Senior Seminar in Food Science and Technology
Fall. 1 credit. Limited to seniors. M 4:30–5:20. D. K. Bandler.
Students prepare and present a seminar on a topic of current interest in food science and technology.

[FOOD 401 Concepts of Product Development
Spring. 2 credits. Prerequisite: FOOD 200 or equivalent. M W 11:15–12:05. Offered alternate years. Not offered 2002, 2004, next offered 2003. J. H. Hotchkiss.
A discussion of the sequence of events in developing and marketing new food products. Topics include food formulation, packaging and labeling, food additive and ingredient regulations, taste panels, market testing, market research, and patents.]

[FOOD 405 Managing Food Waste without Trashing the Environment
Spring. 2 credits. Prerequisite: FOOD 200 or its equivalent. Lec, M 12:30–2:15; lab, M 2:30–4:25. Offered alternate years. Not offered 2002, 2004, next offered spring 2003. J. M. Regenstein.
A look at the various waste streams generated by food plants, institutional feeders, supermarkets, and restaurants. What is the role of waste minimization? What technologies can control or remediate the problems? What are the disposal, composting, and recycling options? What are the legal requirements locally, statewide, and nationally that affect various food waste processes? This course serves as a general introduction to available waste management technologies and to policy issues faced by a wide range of businesses and production plants.]

FOOD 406 Dairy and Food Fermentations
Fall. 2 credits. Prerequisite: BIOMI 290. Letter grades only. R 12:20–2:15. M. Wiedmann.
This is a lecture course covering the basic principles of fermentation, the microbiology of food fermentations (including the physiology and genetics of fermentative microorganisms), starter cultures and their preparations and applications as well as specific examples of food fermentations. Selected textbook readings are supplemented with papers from peer-reviewed journals. Significant parts of class focus on discussion and critical analysis of the assigned reading materials, questions and hot topics.

FOOD 410 Sensory Evaluation of Food
Fall. 2–3 credits (1 lab credit). Prerequisite: statistics. Lec, T R 9:05–9:55; lab, F 1:25–4:25. H. T. Lawless.
Topics include the sensory evaluation methods used to test the flavor, appearance,

and texture of foods by quantitative description and simple difference testing; consumer testing for product acceptability; sensory tests in quality control; strategic product research; and product development. The psychological principles in sensory testing and statistical methods for sensory data analysis are presented. The laboratory provides first hand experience in organizing and conducting sensory tests and an introduction to online date collection and analysis. Undergraduate Food Science majors are required to take both the lecture and the laboratory.

FOOD 415 Principles of Food Packaging
Spring. 3 credits. M W F 9:05–9:55. Offered alternate years. Next offered spring 2002 and 2004; not offered spring 2003. J. H. Hotchkiss.
The chemical and physical properties and manufacture of the basic materials used to construct packaging are discussed. The influence of packaging on shelf life is presented. Emphasis is on newer packaging technologies and materials. Economics, design, and regulation of food packaging are briefly presented.

FOOD 417–418 Food Chemistry I and II
Spring 417; fall 418. 3 credits, spring; 2 credits, fall. Prerequisites: CHEM 257 or BIOBM 330 or 331. S-U or letter grade. FOOD 417, M W F 9:05; FOOD 418, M W 9:05. Both courses will be offered in 2001–2002. J. W. Brady.
A course on the chemistry of food and food ingredients. Chemical and physical properties of water, proteins, lipids, carbohydrates, and other food components/additives are discussed in the context of their interactions and functional roles in foods. The effects of chemical changes during processing and storage on quality and nutritional aspects of several food commodity groups (milk, meat, fruits and vegetables, cereals and legumes) are described.

FOOD 419 Food Chemistry Laboratory
Spring. 2 credits. Prerequisites: CHEM 257 or BIOBM 330 or 331 and concurrent registration in FOOD 417. W 12:20–4:25. D. D. Miller and J. M. Brown.
A laboratory course emphasizing fundamental chemical principles and laboratory techniques necessary for an understanding of the chemistry of foods. Relationships between chemical composition and functional, nutritional, and organoleptic properties of foods are stressed. Many of the laboratory techniques involved are common to those used in biochemistry laboratories (e.g., spectrophotometry, chromatography, enzyme assays) but are applied to specific foods or beverages.

FOOD 423 Physical Principles of Food Preservation and Manufacturing
Fall. 3 credits. Prerequisites: FS 321. Lec, T R 11:15–12:05; disc, T 12:20–2:15. S. J. Mulvaney and J. S. Roberts.
This course emphasizes the fundamental principles that underlie much of food preservation and manufacturing. A systems analysis approach is used to make connections between the chemical and physical changes that occur in food processing and their impact on food quality. Topics include materials properties of foods, heat processing, freezing, concentration and drying. Selected products serve as case studies for more complex manufactured foods.

FOOD 424 Food Polymer Science: Principles and Applications
Spring. 3 credits. Prerequisites: introductory chemistry and physics. Lec, T R 10:10–11:00; disc R 11:15–12:05. S. Mulvaney.
Integration of polymer science, food science, and materials science principles as the basis for characterization of the physical properties of food materials. Emphasis is on unique aspects of food materials, e.g. plasticization by water, gelation, lipids, transient networks, and effects of thermal treatments on material properties. Problems and case studies based on proteins, starches, and hydrocolloids relevant to foods.

FOOD 430 Understanding Wine & Beer
Spring. 3 credits. Prerequisites: introductory biology and chemistry or permission of instructor. Students must be 21 years old by the second day of class (Jan. 24, 2002) to enroll. S-U grades optional. T R 1:25–3:20. T. E. Acree, T. Henick-Kling, K. J. Siebert.
An introduction to wine and beer appreciation through the study of fermentation biology, wine and beer composition and sensory perception. Samples of beers and wines are used to illustrate the sensory properties, microbiological processes, and chemical components that determine wine and beer quality. Students learn to recognize the major features of beer and wine that determine sensory quality and know the processes that produced them. Topics include the psychology and chemistry of bouquet, taste, and aroma—the microbiology of fermentation and spoilage—and the sensory properties of wines and beers from different raw materials (produced in various climates with different agricultural practices) and with different wine and beer production techniques.

FOOD 447 International Postharvest Food Systems
Fall. 2 or 3 credits. Prerequisite: freshman chemistry. S-U grades optional. T R 10:10–11:00. M. C. Bourne and staff.
An interdisciplinary course designed for all undergraduate and graduate students. Describes postharvest food losses and methods to reduce the loss. Topics include storage and care of unprocessed and minimally processed foods such as cereal grains, fruits, vegetables, tubers, and fish; biology and control of fungi, insects, and vertebrates in foods; chemical causes of quality loss; effects of climate; and economic and social factors affecting food preservation and storage. Emphasis is given to the problems in developing countries. The third credit requires a written case study of a country or commodity.

FOOD 450 Fundamentals of Food Law
Spring. 2 credits. Offered alternate years. Next offered spring 2002 and 2004; not offered spring 2003. J. M. Regenstein.
Introduction to the complex array of federal and state statutes and regulations that control the processing, packaging, labeling, and distribution of food, including aspects of safety and nutritive value. Emphasis is on the Food and Drug Administration and U.S. Department of Agriculture regulations, but the course also refers to other regulatory agencies. Emphasis is placed on how a food or agricultural professional interacts with this legal system during legislative action, regulatory rule making, and with respect to compliance.

[FOOD 456 Advanced Concepts in Sensory Evaluation
Spring. 2 credits. Prerequisite: FOOD 410. S-U grades optional. Offered alternate years. Not offered spring 2002; next offered spring 2003. F 1:25–3:20. H. T. Lawless.
Readings and discussions of primary source materials in sensory evaluation, including recent advances in sensory methods, historical perspectives, psychophysics, perceptual biases, and multivariate statistical approaches to sensory data. A major independent research project is conducted on a current issue in sensory evaluation.]

FOOD 494 Special Topics in Food Science
Fall or spring. 4 credits maximum. S-U grades optional. Staff.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

FOOD 497 Individual Study in Food Science
Fall or spring. 3 credits maximum. Prerequisite: permission of instructor. Students must register with an Independent Study form (available in 140 Roberts Hall). S-U grades optional. Staff.
May include individual tutorial study, a special topic selected by a professor or a group of students, or selected lectures of a course already offered. Since topics vary, the course may be repeated for credit.

FOOD 498 Undergraduate Teaching Experience
Fall or spring. 3 credits maximum. Prerequisite: permission of instructor. Students must register with an Independent Study Form (available in 140 Roberts Hall). S-U grades only. Staff.
Students assist in teaching a course appropriate to their previous training and experience. Students meet with a discussion or laboratory section and regularly discuss objectives with the course instructor.

FOOD 499 Undergraduate Research in Food Science
Fall or spring. 4 credits maximum. S-U grades optional. Students must register with an Independent Study form (available in 140 Roberts Hall). This course may be repeated for credit. Staff.
Students conduct original research directed by a food science faculty member.

FOOD 599 Research for Lausanne Exchange Students
Fall/spring. 10 credits maximum. Prerequisite: permission of instructor. S-U grades optional. Staff.
Undergraduate senior thesis research for Lausanne exchange students only. Students conduct original research directed by a Food Science faculty member. A final report is written and presented to the faculties of both Cornell University and the University of Lausanne.

FOOD 600 Seminar in Food Science
Fall and spring. 1 credit. S-U grades only. Required of all food science graduate students. T 4:00–5:00. Staff.

A weekly seminar series on contemporary topics and issues in the Field of Food Science and Technology. Representatives from academia, industry, and government provide presentations on a wide variety of topics. Graduate students in the Field of Food Science and Technology may use the forum to present their required thesis research seminar. Required of all graduate students in the Field of Food Science and Technology. Strongly recommended for graduate students minoring in Food Science and Technology.

[FOOD 604 Chemistry of Dairy Products
Fall. 2 credits. Limited to 16 students. Prerequisites: Food Science 210, 417, 418, and a dairy foods processing course. Permission of instructor required, if lacking prerequisites. F 1:25–3:30. Offered alternate years. Not offered fall 2001 or 2003, next offered fall 2002. D. M. Barbano.
The chemical and physical changes that occur in dairy products prior to, during, and after processing are covered. This course emphasizes current research in dairy chemistry.]

[FOOD 605 Physical Chemistry of Food Components
Fall. 3 credits. Prerequisite: an undergraduate course in physical chemistry. M W F 10:10. Offered alternate years. Not offered fall 2001. J. W. Brady.
This course covers the physical properties of food molecules. Emphasis is placed on the molecular basis of structural characteristics; colloidal properties; molecular interactions; foams, gels; and water binding of foods.]

FOOD 607 Advanced Food Microbiology
Spring. 2 credits. Prerequisites: Microbiology (BIOMI 290), Food Microbiology (FOOD 394). M W 11:15. Offered alternate years. Not offered in spring 2003. Next offered spring 2002. M. Wiedmann.
This two-credit course explores advanced topics in Food Microbiology. A major emphasis is placed on critical evaluation of current literature and on microbiological concepts that affect food microbiology. Specific areas that are covered include microbial ecology of foods, rapid detection and typing methods for foodborne pathogens, microbial modeling, pathogenesis of foodborne diseases, and food applications of genetic engineering. Some guest lectures may be arranged to provide an introduction to other advanced food microbiology topics (e.g., risk assessment).

[FOOD 608 Chemometric Methods in Food Science
Fall. 2 credits. Prerequisite: basic statistics and chemistry or permission of instructor. S-U grades optional. W 1:25–3:20. Offered alternate years. Not offered fall 2001 and 2003; next offered in 2002. K. J. Siebert.
Food science applications using multivariate statistical methods (chemometrics) include extracting information from large data sets, modeling molecular and product properties, optimizing analytical methods and processing operations, discerning relationships between product composition and sensory properties, identifying cultivars or species, and detecting adulteration. The techniques covered are also applicable to many other problems in biology and chemistry.]

FOOD 616 Flavors—Analysis and Applications
Spring. 2 credits. S-U grades optional. Lec, F 1:25; disc, F 2:30. Offered alternate years. Next offered spring 2002 and 2004; not offered spring 2003. H. T. Lawless and T. E. Acree.
An advanced course in sensory and instrumental analysis of flavors, flavor chemistry, and flavor applications in foods for food scientists and those in related fields concerned with human food perception and consumption. The course surveys taste, aroma and volatile flavors, and trigeminal stimuli from the perspectives of chemical structures, methods of analysis, uses and interactions in food systems, and consumer acceptance.

FOOD 620 Food Carbohydrates (also NS 620)
Spring. 2 credits. Limited to qualified seniors and graduate students. Prerequisite: BIOBM 330 or equivalent. T R 10:10. Offered alternate years. Next offered spring 2002 and 2004; not offered spring 2003. B. A. Lewis and J. W. Brady.
A consideration of the chemistry of carbohydrates, including sugars, starches, pectins, hemicelluloses, gums, and other complex carbohydrates. Emphasis is on the intrinsic chemistry and functionality in food systems and the changes occurring during food processing and storage.

FOOD 621 Food Lipids
Fall. 2 credits. Letter grade only. Prerequisites: FOOD 417 and a Biochemistry course. Offered alternate years. Next offered fall 2001; not offered fall 2002 or 2004. R. Liu.
An advanced course in food lipids. Describes the physical, chemical, biochemical, and functional properties of lipids. Emphasis is on lipid oxydation, emulsions, functional foods associated with lipids, and modern analytical methodology of lipids.

FOOD 665 Engineering Properties of Foods
Spring. 2 credits. Prerequisite: course in transport processes or unit operations as applied to foods; or permission of instructor. T R 12:20–1:10. Offered alternate years. Next offered spring 2002; not offered spring 2003. S. S. H. Rizvi and S. J. Mulvaney.
Theories and methods of measurement and prediction of rheological, thermal, and mass transport properties of foods and biomaterial systems. Emphasis is on physical-mathematical basis of measurement as well as the prediction processes. Examples of appropriate use of these properties in engineering design and analysis of food processes are also provided.

FOOD 694 Special Topics in Food Science
Fall or spring. 4 credits maximum. S-U grades optional. Staff.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

FOOD 695 Current Readings in Food Science
Fall and spring. 1 credit. Prerequisite: 300- to 400-level course relevant to the chosen topic. S-U grades only. Lec., by arrangement/1 hour per week. Staff.
A seminar series on current topics chosen by participating faculty and students on a rotating basis. Format consists of weekly discussion groups with each participant presenting at least one oral report based on independent reading. Multiple sections focusing on different topics may be taught in any given semester. Topics include (but are not limited to) Food Microbiology and Food Safety; Food Chemistry; Packaging; Food Engineering. This course can be taken multiple times. Graduate students in Food Science are strongly encouraged to enroll in this course. Interested students should contact the designated instructor(s) for each term.

FOOD 698 Graduate Teaching Experience
Fall and spring. 1 to 3 credits. S-U grades only. Staff.
Designed to give graduate students teaching experience through involvement in planning and teaching courses under the supervision of field faculty members. The experience may include leading discussion sections; preparing, assisting in, or teaching lectures and laboratories; and tutoring.

FOOD 800 Masters-Level Thesis Research
Fall or spring. Credit TBA. Maximum credit, 12. Prerequisite: limited to master's candidates; permission of Special Committee Chair. S-U grades only. Graduate faculty.

FOOD 900 Graduate-Level Thesis Research
Fall or spring. Credit TBA. Maximum credit, 12. Prerequisite: limited to doctoral students who have not passed the "A" exam; permission of Special Committee Chair. S-U grades only. Graduate faculty.

FOOD 901 Doctoral-Level Thesis Research
Fall or spring. Credit TBA. Maximum credit, 12. Prerequisite: limited to doctoral students who have passed the "A" exam; permission of Special Committee Chair. S-U grades only. Graduate faculty.

Related Courses in Other Departments

Introduction to Computing (ABEN 151)

Introduction to Business Management (AEM [ARME] 220)

Marketing (AEM [ARME] 240)

Food Industry Management (AEM [ARME] 443)

Biological and Environmental Transport Processes (ABEN 350)

Computer-Aided Engineering: Applications to Biomaterials and Food Processing (ABEN 453)

Practical Aspects of Postharvest Handling of Horticultural Crops (HORT 325)

Introduction to Culinary Arts (H ADM 230)

FREEHAND DRAWING AND SCIENTIFIC ILLUSTRATION

Freehand Drawing is a program in the Department of Horticulture. Other courses offered by the department are listed under Horticulture.

[FR DR 109 Nature Drawing
Fall. 3 credits. Limited to 25 students. S-U grades optional. Permission of instructor required. M W F 10:10–12:05. Not offered 2001–2002. R. J. Lambert.
A beginning course with emphasis on the drawing of natural forms: plants, animals, and landscapes. Of particular interest to students in floriculture and ornamental horticulture, landscape architecture, biological sciences, nature education, or similar fields. Outside field notebook assignments.]

[FR DR 211 Freehand Drawing and Illustration
Fall. 2 credits. Prerequisite: FR DR 109 or equivalent. S-U grades optional. 6 studio hours scheduled in 2 or 3 hour units between 9:05 and 12:05 M T W R. Not offered 2001–2002. R. J. Lambert.
Progression to the organization of complete illustrations. Subject matter largely from sketchbooks, still life, and imagination. Composition, perspective, and ways of rendering in different media are considered.]

FR DR 214 Watercolor
Spring. 2 credits. S-U grades optional. 4 studio hours scheduled in 2 hour units between 9:05 and 12:05 and 2 hours outside sketching. T W R. R. J. Lambert.
A survey of watercolor techniques. Subject matter largely still life, sketchbook, and on-the-spot outdoor painting.

FR DR 316 Advanced Drawing
Fall. 2 credits. Prerequisite: FR DR 109, 211 or permission of instructor. S-U grades optional. 4 hours TBA. T W R 9:05–12:05, 2 hours outside sketching. R. J. Lambert.
For students who want to attain proficiency in a particular type of illustration or technique.

[FR DR 417 Scientific Illustration
Fall. 2 credits. Prerequisite: FR DR 211 or 316 or equivalent. S-U grades optional for graduate students only. Not offered fall 2001. R. J. Lambert.
A survey of methods of illustration. Training in techniques of accurate representation in media suitable for reproduction processes, including pen and ink, scratchboard, wash, and mixed media.]

FRUIT AND VEGETABLE SCIENCE: HORTICULTURAL SCIENCE

See Horticulture.

HORTICULTURE

H. C. Wien, chair; N. L. Bassuk, R. R. Bellinder, L. Cheng, L. E. Drinkwater, L. A. Ellerbrock, G. L. Good, D. E. Halseth, R. J. Lambert, C. P. Mazza, I. A. Merwin, W. B. Miller, K. W. Mudge, A. M. Petrovic, M. P. Pritts, D. A. Rakow, A. Rangarajan, F. S. Rossi, L. D. Topoleski, C. B. Watkins, T. C. Weiler, L. A. Weston, T. H. Whitlow, D. W. Wolfe

Courses by Subject:

General horticulture: 101, 102
Public garden management: 485
Crop production:
Agroforestry: 415
Fruit: 442, 444, 445
Greenhouse and controlled environments: 310, 400
Nursery: 400, 420
Turfgrass: 330, 475
Vegetable: 225, 366, 460
Extension education: 476
Horticultural physiology: 400, 449, 455, 460, 462, 615, 620
Independent study, research, and teaching: 495, 496, 497, 498, 499, 500, 700, 800, 900
Internships: 496
Landscape horticulture: 301, 435, 440, 485, 491, 492
Plant materials: 243, 300, 301, 317, 491, 492
Plant propagation: 317, 400
Postharvest physiology: 325, 625
Seminars: 600
Special topics: 494, 635, 694
Turfgrass management: 330, 475
Vegetable types and varieties: 220, 465

Note: class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

HORT 101 Horticultural Science and Systems
Fall. 4 credits. Lec, M W F 9:05; lab, W 1:25–4:25. I. A. Merwin.
The science and technology of horticultural plants grown for foods and beverages, and ornamental, landscape or recreational purposes. Lectures, labs and field trips involve natural history and evolution of horticultural plants, botany and physiology, sustainable management of soil, water and plant nutrition, breeding and propagation, ecological and landscape functions, and integrated design and management of horticultural plantings and production systems.

[HORT 102 General Horticulture
Spring. 4 credits. Each lab limited to 25 students. Lecs, M W F 10:10; lab M T or W 2–4:25. Not offered 2001–2002.
L. D. Topoleski.
The subject matter of this course acquaints the student with the applied and basic science of horticulture. Open to all students who want a general knowledge of the subject or who want to specialize in horticulture but have a limited background in practical experience or training in plant science. Includes flower, fruit, and vegetable growing and gardening techniques.]

[HORT 220 Vegetable Types and Identification
Fall. 2 credits. T 2–4:25. Not offered 2001.
L. Topoleski.
The subject matter of this course acquaints students with the vegetable species grown in the Northeast and the pests and disorders encountered in their production. Subjects covered include identification of economically destructive weeds, diseases, and insects of vegetables, identification of vegetable and weed seeds, nutrient deficiencies, vegetable judging, and potato grade defects.]

HORT 225 Vegetable Production
Fall. 4 credits. Lecs, M W F 11:15; lab, W 2–4:25; 4 fieldtrips (September). W 11:15–6:00. L. A. Ellerbrock.
Intended for those interested in the production, processing, and marketing of vegetables. Topics included are techniques, problems, and trends in the culture, harvesting, and storage of the major vegetable crops. Field trips to conventional and organic farms and hands-on experience in growing vegetables in the greenhouse are included.

[HORT 243 Taxonomy of Cultivated Plants (also BIOPL 243)
Fall. 4 credits. Prerequisite: 1 year of introductory biology or written permission of instructor. May not be taken for credit after BIOPL 248. Lec, M W F 10:10–11:00; lab, M or W 2:00–4:25. Offered even years. M. A. Luckow.
A study of ferns and seed plants, their relationships, and their classification into families and genera, emphasizing cultivated plants. Particular emphasis is placed on gaining proficiency in identifying and distinguishing families and in preparing and using analytic keys. Attention is also given to the economic importance of taxa, to the basic taxonomic literature, and to the elements of nomenclature.]

HORT 300 Herbaceous Plant Materials
Fall. 3 credits. Fee for lecture-laboratory manual: $35. Lecs, T R 10:10; lab, T 2–4:25. W. B. Miller.
Identification, use, characteristics, and garden cultural requirements of annual and herbaceous perennial plants, especially those used in northern climates. Practical gardening experiences at selected campus locations. Field trips to nearby specialty nurseries. Garden planting design is not a component of the course.

HORT 301 Plants for Interiors
Spring. 3 credits. Lecs, M W 11:15; lab, M 2–4:25. Offered even years. Next offered 2002. T. C. Weiler.
Study of plants for interiors: identification, design characteristics, and cultural requirements; use of plants as elements of planting design (trees, shrubs, groundcovers, and accent plants including potted flowering plants and cut flowers); the interior landscape industry (organization, bidding, installation, maintenance). Required three-day field trip, estimated cost, $130.

[HORT 310 Production and Marketing of Crops Grown in Controlled Environments
Spring. 4 credits. Letter grade only. Offered odd years; next offered 2003. Lecs, T R 10:10; lab R 2–4:25. 2.5 hours TBA.
T. C. Weiler.
Basics of establishing and managing agricultural production in environmentally optimized facilities; technology basics, systems and practices, structures, systems and equipment, materials handling, heating and cooling, lighting, fertilizing and irrigation, environmental stewardship, integrated pest management, business management; world centers of production; production of cut, pot, bedding, vegetable, and fruit crops in controlled environments, emphasizing predictive harvesting through environmental, physical, and chemical management of growth and development. Each student grows one or more crops. Required three-day field trip, estimated cost, $130.]

HORT 317 Seed Science and Technology (also CSS 317)
Fall. 3 credits. Prerequisites: BIOPL 241 or an equivalent course approved by instructor. Letter grade only. Offered alternate years. Lecs, T R 11:40–12:30; lab, R 1:25–4:25 P.M. A. G. Taylor, Geneva Experiment Station.
Study of the principles and practices involved in seed production, conditioning, storage, quality management and stand establishment. Information is applicable to various kinds of agricultural and horticultural seeds. Hands-on laboratory experience.

[HORT 325 Practical Aspects of Postharvest Handling of Horticultural Crops
Spring. 3 credits. Lecs, M W 9:05; lab T 1:25–4:25. Next offered 2003. Staff.
A study of changes that occur in horticultural crops between harvest and consumer. Practices that affect the rate of change and the final effect on quality of the commodity are discussed. Maturity/quality indices, preharvest treatments, and harvesting/handling practices and storage/transportation requirements of selected horticulture crops are covered.]

[HORT 330 Turfgrass Management
Fall. 3 credits. Prerequisite: SCAS 260. Lec, M W 10:10; lab, F 10:10–12:05. Not offered 2001–2002. A. M. Petrovic.
Study of the scientific principles involved in the management of golf courses, athletic fields, parks and industrial grounds, and commercial sod production. Considerations given to principles of establishment, mowing, irrigation, growth and development, species selection, pest management, and nutrition in the management of turfgrass sites.]

HORT 366 The Soil Ecosystem (also CSS 366)
Spring. 3 credits lecture; 1 credit lab. Lab cannot be taken without lecture. Prerequisites: one year of introductory biology. S-U optional. Lecs, T R 10:10–11:25; lab, W 1:25–4:25. J. E. Thies, L. E. Drinkwater.
Activities of the soil biata are crucial for the continued functioning and renewal of soil ecosystems. Through study of the soil as an ecosystem, students gain an understanding of the diversity of soil organisms and the critical roles that microbial activities and interactions have in agricultural production and environmental protection. Through a small research project, students also gain competency in developing research questions and formulating hypotheses, planning appropriate methods for gathering and interpreting data, and summarizing research work.

HORT 400 Principles of Plant Propagation
Fall. 3 credits. Prerequisites: BIOPL 242 and 244 or another course in plant physiology. Lecs, T R 9:05; lab, R 1:25–4:25. K. W. Mudge.
Sexual (seed) propagation and asexual (vegetative) propagation including cuttage, graftage, tissue culture, layering, and specialized vegetative reproductive structures. Physiological, environmental, anatomical principles, and industry applications are stressed in lecture and hands-on skills in laboratories. Examples include both temperate and tropical horticultural, agronomic, and forestry crops.

HORT 401 The How, When and Why of Grafting—A Distance Learning Approach
Spring. 2 credits. Lec: autotutorial (web, cd); lab: greenhouse/autotutorial; discussion: e-mail. One introductory face-to-face meeting TBA. K. W. Mudge.
A ten-week, web/CD-based autotutorial approach to the principles and practices of grafting and budding as applied to plant propagation. Emphasis is on the role of grafting in modern horticultural practice and on student development of hands on grafting skills. Instruction involves web-based asynchronous presentation of lecture materials (web, CD-rom), asynchronous discussion and hands-on, autotutorial greenhouse laboratory exercises in grafting.

HORT 415 Principles and Practices of Agroforestry (also NTRES 415 and CSS 415)
Fall. 3 credits. Prerequisites: senior or graduate standing or permission of instructor. S-U option. Lec, M W F 10:10-11:00. Optional laboratory, HORT 416 (also NTRES 416 and CSS [SCAS] 416). Offered alternate years. E. Fernandes, K. Mudge, L. Buck.
An introduction to modern and traditional agroforestry systems which involves spatial or temporal integration of multipurpose woody plants (trees or shrubs) with annual or perennial crops or with livestock. Interactions between woody and nonwoody components of agroforestry systems are considered, based on above- and below-ground processes. The sustainability of agroforestry systems is critically examined from biophysical, socio-economic and policy perspectives.

HORT 416 Principles and Practices of Agroforesty—Laboratory (also NTRES 416 and CSS 416)
Fall. 1 credit. Optional lab component of HORT 415 (also NTRES and CCS [SCAS]). S-U grades optional. Prerequisites: junior, senior, or graduate standing or permission of instructor; prior or concurrent enrollment in HORT 415. W 1:25-4:25. Offered alternate years. K. Mudge, E. Fernandes, L. Buck.
An integrated set of laboratory and field exercises designed to develop competency in diagnostic and management skills applied to agroforestry practice. Sessions include field trips to local practitioners as well as working demonstration farms and forests, case study design and analysis, use of computer-based sources of information, and practical skills with woody plants including identification, propagation, planting, pruning, and measurement.

HORT 420 Principles of Nursery-Crop Production
Fall. 4 credits. Prerequisite: HORT 400. Lecs, M W F 9:05; lab, M 2–4:25. Field trips. Offered odd years. G. L. Good.
Principles of commercial production of nursery crops to marketable stage, including postharvest handling and storage. Term project required. Field trips are made to commercial nurseries.

[HORT 435 Landscape Management
Fall. 4 credits. Prerequisites: HORT 230 or 335. Lecs, M W F 9:05; lab, M 2:00–4:25. Offered even years. G. L. Good.
A study of the practices involved in the maintenance of woody ornamental plants in the landscape. The major emphasis is on post-planting techniques, including water and fertilization management, weed management, pruning, and general tree care. Labs have a hands-on focus.]

HORT 440 Restoration Ecology
Fall. Weeks 1–10. 3 credits. Prerequisite: upper division or graduate standing. Letter grade only. Lecs, T R 10:10; lab, F 1:25–4:25. Offered odd years; 2001. T. H. Whitlow.
An inquiry based treatment of the principles and methods of ecology, conservation biology, hydrology, soil science and related disciplines applied to the restoration of degraded terrestrial ecosystems. Weekly labs, four weekend field trips, and a semester-long project provide many opportunities for experiential learning. Substantial commitment outside of the classroom is expected.

[HORT 442 Berry Crops: Culture and Management
Fall. 3 credits. Lecs, M W 9:05; lab, M 1:25–4:25. Offered even years. M. P. Pritts.
A study of the evolution, breeding history, and physiology of strawberries, raspberries, blackberries, blueberries, and other minor small fruit crops, and of cultural practices that influence productivity, fruit quality, and pest damage. Marketing and economics are considered, and alternative production practices for both commercial and home gardeners are discussed. Frequent field trips enhance classroom activities.]

HORT 444 Vineyard Management
Fall. 3 credits. Lecs, T R 9:05; lab, R 1:30–4:25. R. M. Pool.
Commercial grape production with an emphasis on the problems of production in cold climates. Students examine site selection, world and regional grape varieties, and the anatomical and physiological basis for vineyard management decision making. Laboratory exercises and field trips offer hands-on experience.

HORT 445 Orchard Management
Spring. 3 credits. S-U grades optional. Lec T R 10:10; lab, T 1:25–4:25. Offered even years. A. Merwin.
The science and technology of deciduous tree-fruit production. Topics include basic tree and fruit physiology, orchard renovation and design systems, nutrition, irrigation and freeze protection practices, tree pruning and training, post-harvest fruit storage, marketing and economic spreadsheet models, monitoring and decision systems for integrated pest management, and efficient use of orchard equipment. Emphasis is on the agroecology of perennial crop systems, with labs providing hands-on experience in orchard management. Previous coursework in horticulture and other plant sciences is suggested, but not a prerequisite.

HORT 449 Green Signals and Triggers—The Plant Hormones (also BIOPL 449)
Fall. 1 credit. Prerequisites: introductory biology course and permission of instructor. S-U grades optional. Offered odd years. Lecs, F 1:25–2:15. P. J. Davies.
A study of the plant hormones and how they regulate plant growth and development. Topics include the discovery, role in growth and development, mode of action and practical uses of the plant hormones auxin, gibberellins, cytokinins, abscisic acid, ethylene, and brassinosteroids.

HORT 455 Mineral Nutrition of Crops and Landscape Plants (also CSS 455)
Spring. 3–5 credits. Prerequisite: CSS 260 and BIOPL 242, or equivalent. Lecs, M W F 9:05; lab, R 1:30–4:00. Offered alternate years; not offered spring 2003. H. C. Wien and staff.
A modular course on principles of plant mineral nutrition and nutrient management. A mandatory module on principles is followed by others on agronomic crops, vegetables, floriculture, and fruit crops. Each module carries one credit; a minimum of three credits must be taken in one semester. By the end of the course, students understand the principles of mineral nutrient function in crop plants, are able to diagnose deficiencies by symptoms and tissue tests, and can devise organic and conventional nutrient management schemes that maximize productivity and mineral nutrient quality.

HORT 460 Plant-Plant Interactions
Spring. 3 credits. Prerequisite: any crop production on plant ecology course or permission of instructor. Lecs, T R 9:05; lab/disc, M 2–4:25. D. W. Wolfe.
Mechanisms by which plants interfere or positively interact in the context of environmental conditions such as light, temperature, and fertility. Competitive and chemical interactions are considered between weeds and crops, among crops in polyculture, and between individuals in monoculture. Most examples are taken from temperate and tropical monoculture and intercropping systems, but implications for natural ecosystems are also considered.

[HORT 462 Vegetable Crop Physiology
Spring. 3 credits. Prerequisites: HORT 225 and BIOPL 242. Lecs, T R 9:05; lab/disc, M 2–4:25. Offered alternate years. Not offered spring 2002. H. C. Wien.
Study of the physiological processes that determine the timing, quantity, and quality of vegetable crop yields. Processes of flower induction, fruit set, fruit growth, and the relations between vegetative and reproductive growth are covered. The course emphasizes practical hands-on greenhouse experiments and small group discussions.]

HORT 475 Golf Course Management
Fall. 2 credits. Prerequisite: HORT 330 or equivalent. Lecs, F 1:25–4:25. Offered odd years. A. M. Petrovic.
Advanced study in the management of golf course operations including selection of root zone materials, fertilization practices, integrated pest management practices, irrigation systems, environmental based decision making, personnel management, and financial operations. Analysis of a central New York golf courses provides the basis for discussion.

[HORT 476 Practical Problem Solving in Horticulture
Fall. 2 credits. Prerequisite: permission of instructor. Lec/disc, W 1:25–4:25. Next offered fall 2002. C. P. Mazza.
Foundation for extension or similar career oriented students. Application of horticultural science principles to practical situations faced primarily by home gardeners. Techniques of synthesizing information from various scientific disciplines and strong emphasis on communications skills. Classes led by staff in several departments. Topics are interdisciplinary, drawing from expertise in horticultural science (landscape and food), entomology, plant pathology, natural resources, and Cornell Plantations.]

HORT 480 Plantations Seminar Series
Fall. 1 credit. S-U grade only. W 7:30 P.M. D. A. Rakow.
A 10-week series of seminars given by prominent speakers on a variety of horticultural, natural sciences, and human cultural themes.

[HORT 485 Public Garden Management
Spring. 3 credits. Prerequisites: HORT 300 or HORT 301; HORT 230 or HORT 335. Lec, T R 10:10-11:00, lab, T R 11:15-12:05. Two-and-a-half-day field trip to visit other botanical gardens and arboreta. Next offered spring 2003. D. A. Rakow.
The course explores the history of public gardens, types of contemporary public gardens, and the operation of botanical gardens and arboreta. Included are separate units on: collections curation, design of collections, management of landscapes and natural areas, educational programming, interpretive programs, research, financial management, and staffing.]

HORT 491 Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment (also LA 491)
Fall. 4 credits. Prerequisites: major in horticulture or landscape architecture or permission of instructor. Limited to 48 students. Preregistration required. Lec, T R 12:20–1:10; Lab, T R 1:25–4:25. N. L. Bassuk and P. J. Trowbridge.
This course focuses on the identification, uses, and establishment of woody plants in urban and garden settings. By understanding the environmental limitations to plant growth, students can critically assess potential planting sites, select appropriate trees, shrubs, vines, and ground covers for a given site, and learn about the principles and practices of site amelioration and plant establishment. Design followed by written specifications and graphic details is produced to implement these practices. A project where students implement what they have learned by creating a new landscape serves to integrate theory, principles, and practices.

HORT 492 Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment (also LA 492)
Spring. 4 credits. Prerequisite: a passing grade in HORT/LA 491. Attendance limited to horticulture and landscape architecture majors or permission of the instructors. Limited to 48. Preregistration required. Lec, T R 12:20–1:10, lab, T R 1:25–4:25. N. L. Bassuk and P. J. Trowbridge.
The second half of this course continues focus on the winter identification, uses and establishment of woody plants in urban and garden settings. Issues of site assessment and soil remediation are emphasized in addition to soil volume calculations, drainage and surface detailing, and planting techniques. Students critically assess potential planting sites, select appropriate trees, shrubs, vines and ground covers for a given site. Design for specific sites followed by written specifications and graphic details are produced to implement these proposals. Students implement in a hands-on manner, site remediation and planting techniques they have learned by creating new landscapes that serve to integrate theory, principles, and practices. Together, HORT/LA 491 and 492 constitute an integrated course. Attendance limited to Horticulture and Landscape Architecture majors or permission of the instructors.

HORT 494 Special Topics in Horticulture
Fall or spring. 4 credits maximum. S-U grades optional.
The department teaches "trial" courses under this number. Offerings may vary by semester, and will be advertised before the semester begins. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

HORT 495 Undergraduate Seminar—Current Topics in Horticulture
Fall and spring. 1 credit. Undergraduate participation in weekly departmental seminar series. Graduate students should enroll in HORT 600. May be taken four times for one credit per semester. S-U grades only. R 4. L. A. Weston, D. W. Wolfe.

HORT 496 Internship in Horticultural Sciences
Fall or spring. Credit variable. S-U grades optional. Prerequisite: permission of student's adviser **in advance of participation** in internship programs. Students must register with an Independent Study form (available in 140 Roberts Hall) signed by the faculty member who will supervise their study and assign their grade. Hours TBA. Staff.

HORT 497 Independent Study in Horticultural Sciences
Fall or spring. Credit variable. S-U grades optional. Prerequisite: permission of instructor(s). Students must register with an Independent Study form (available in 140 Roberts Hall). Independent study in horticultural sciences under the direction of one or more faculty members. Hours TBA. Staff.

HORT 498 Undergraduate Teaching Experience
Fall or spring. Credit variable. S-U grades optional. Prerequisites: previous enrollment in course to be taught or equivalent, and written permission of the instructor. Students must register with an Independent Study form (available in 140 Roberts Hall). Hours TBA. Staff.
Designed to give qualified undergraduate students teaching experience through actual involvement in planning and teaching horticultural sciences courses under the supervision of departmental faculty members. This experience may include leading discussion sections; preparing, assisting in, or teaching laboratories; and tutoring.

HORT 499 Undergraduate Research
Fall or spring. Credit variable. S-U grades optional. Prerequisite: permission of instructor. Students must register with an Independent Study form (available in 140 Roberts Hall.) Hours TBA. Staff.
Undergraduate research projects in horticultural sciences.

HORT 500 Master of Professional Studies (Agriculture) Project
Fall or spring. 1–6 credits. (6 credits maximum toward M.P.S. [Agriculture] degree). S-U grades optional. Staff.
A comprehensive project emphasizing the application of principles and practices to professional horticultural teaching, extension,

and research programs and situations. Required of Master of Professional Studies (Agriculture) candidates in the respective graduate fields of horticulture.

HORT 600 Seminar in Horticulture
Fall and spring. 1 credit. S-U grades only. R 4:00. D. W. Wolfe and L. A. Weston.
Weekly seminars consist of graduate student research project reports, faculty research topics, as well as guest speakers from other universities and/or industry. Required of graduate students majoring or minoring in horticulture. Undergraduate students register under HORT 495.

HORT 615 Quantitative Methods in Horticultural Research
Spring. Weeks 1–7. 2 credits. Prerequisite: BTRY 601, BTRY 602 or permission of instructor. S-U grades only. W F 2:30–4:25. Offered alternate years. D. W. Wolfe.
Advantages and limitations of conventional experimental designs and analyses of greenhouse and field (including-on-farm) experiments. Use and interpretation of plant growth analysis techniques. Discussions include critical analysis of published data and research in progress.

[HORT 620 Woody Plant Physiology
Spring. 4 credits. BIOPL, BIOBM 331, CHEM 357, or equivalent, or permission of instructor. Letter grade only. Lecs, T R 8:40–9:55. Lab, T 1:25–4:25. Offered odd years; 2003. T. H. Whitlow.
An examination of physiological processes in woody plants emphasizing whole plant integration and how these processes affect plant growth under both natural and cropping systems. Topics include: evolution of the woody plant form, structure and function of the root and shoot, growth periodicity, dormancy, growth analysis, carbon balance and allocation, root symbioses, and physiological responses to biotic and abiotic stress. Faculty from Geneva and Fruit and Vegetable Science collaborate in teaching.]

[HORT 625 Advanced Postharvest Physiology of Horticultural Crops
Spring. 3 credits. Prerequisite: BIOPL 242 and/or HORT 325. Lecs, T R 10:10; disc, to be arranged. Not offered spring 2002.
Physiological and biochemical aspects of growth and maturation, ripening, and senescence of harvested horticultural plant parts. Topics include morphological and compositional changes during ripening and storage life, some physiological disorders, aspects of hormone action and interactions, and a consideration of control.]

[HORT 635 Tools for Thought
Fall. 1 credit. Open to graduate students only. S-U grade only. 1 hour per week, TBA. Not offered 2001–2002. T. H. Whitlow.
A discussion of readings from Kuhn, Waddington, Wilson, Lewontin, and others emphasizing application of the philosophy of science to the real world practices of scientists.]

HORT 636 Current Topics in Horticulture
Fall or spring. 1 credit. S-U grades only. One hour per week, TBA. Staff.
A seminar series on current topics chosen by participating students and faculty, on a rotating basis. Format consists of weekly discussion groups, with each participant presenting at least one oral report based on independent reading and/or experimentation relating to the chosen topic. Interested students should contact the designated instructor(s) for each term.

HORT 694 Special Topics in Horticulture
Fall or spring. 4 credits maximum. S-U grades optional. Hours TBA. Staff.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committees, and the same course are not offered more than twice under this number.

HORT 700 Graduate Teaching Experience
Fall or spring. Credit variable. Open only to graduate students. Undergraduates should enroll in HORT 498. S-U grades optional. Prerequisite: permission of instructor. Hours TBA. Staff.
Designed to give graduate students teaching experience through involvement in planning and teaching courses under the supervision of departmental faculty members. The experience may include leading discussion sections; preparing, assisting in, or teaching lectures and laboratories; and tutoring.

HORT 800 Thesis Research, Master of Science
Fall or spring. Credit TBA. S-U grades only.

HORT 900 Thesis Research, Doctor of Philosophy
Fall or spring. Credit TBA. S-U grades only.

INTERNATIONAL AGRICULTURE

Note: class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

INTAG 300 Perspectives in International Agriculture and Rural Development
Fall. 2 credits. F 1:25–3:20. R. W. Everett.
A forum to discuss both contemporary and future world food issues and the need for an integrated, multidisciplinary team approach in helping farmers and rural development planners adjust to the ever-changing food needs of the world.

INTAG 314 Tropical Cropping Systems: Biodiversity, Social, and Environmental Impacts (also CSS [SCAS] 314)
Fall. 3 credits. Prerequisite: an introductory course in crop science, soil science, or biology or permission of instructor. Lec, T R 8:40–9:55. E. C. Fernandes.
Characterization and discussion of traditional shifting cultivation, lowland rice-based systems, upland cereal-based systems, smallholder mixed farming including root crops and livestock, plantation fruit and oil crop systems, and agroforestry. In addition to species diversity and domestication, factors such as climate, land quality, soil management, land tenure, labor, and markets are considered. The effect of tropical cropping systems on the environment is evaluated.

INTAG 402 Agriculture in the Developing Nations I
Fall. 2 credits. Prerequisite: International Agriculture 300. F 1:25–3:20. P. A. Arneson and staff.
The goal of this course is to acquaint students with the major issues and problems in international agriculture and rural development and to show how problems in development are being addressed by international, government, and nongovernment agencies. The lectures/discussions attempt to establish the global context for sustainable agricultural development and focus on agriculture in the tropics, using case studies of agricultural development in Latin America, especially Ecuador. This course may be taken as a stand-alone survey course in international agriculture, but it is also the preparatory course for participation in Agriculture in the Developing Nations II (International Agriculture 602), which includes a trip to Ecuador during the intersession.

INTAG 403 Traditional Agriculture in Developing Countries
Fall. 1 credit. S-U only. T 8–8:50. H. D. Thurston, D. Bates, R. Blake, J. Lassoie, A. Power, E. Fernandez, T. Steenhuis.
Today, perhaps over half of the world's arable land is farmed by traditional farmers. They developed sustainable agriculture practices which allowed them to produce food and fiber for millennia with few outside inputs. Many of these practices have been forgotten in developed countries but are still used by many traditional, subsistence, or partially subsistence farmers in developing countries. The course examines traditional systems from several disciplinary points of view.

INTAG 480 Global Seminar: Environment and Sustainable Food Systems (also ALS 480 and EDUC 480)
Spring. 1–3 credits. Prerequisite: juniors, seniors, and graduate students. Letter grade. Lec, R 8:00–9:55 A.M., Lab, 3:35–4:25 P.M. scheduled, one additional hour unscheduled. H. D. Sutphin, P. A. Arneson, and D. Lee.
For description, see ALS 480.

INTAG 497 Independent Study in INTAG
Fall and spring. 1–3 credits. S-U or letter grade. Prerequisites: permission of instructor and signed Independent Study Form. Staff.
Independent Study in INTAG allows students the opportunity to investigate special interests that are not treated in regularly scheduled courses. The student develops a plan of study to pursue under the direction of a faculty member.

INTAG 598 International Development M.P.S. Project Paper
Fall and spring. 1–6 credits. (A maximum of 6 credits may be applied toward M.P.S. degree requirements). Limited to M.P.S. candidates in the Field of International Development (ID). S-U grades only. N. Uphoff.
A problem-solving project entailing either fieldwork and/or library work. The aim of the project is to give students supervised experience in dealing intellectually and analytically with a professional problem related to a substantive area of international development.

INTAG 599 International Agriculture and Rural Development M.P.S. Project Paper

Fall and spring. 1–6 credits. (A maximum of 6 credits may be applied toward M.P.S. degree requirements). Limited to M.P.S. candidates in the Field of International Agriculture and Rural Development (IARD). S-U grades only. R. Blake.

A problem-solving project entailing either fieldwork and/or library work. The aim of the project is to give students supervised experience in dealing intellectually and analytically with a professional problem related to a substantive area of international agriculture and rural development.

INTAG 602 Agriculture in the Developing Nations II

Spring. 3 credits. Prerequisites: INTAG 300 or equivalent, INTAG 402, and permission of instructors. Cost of field-study trip includes air fare and approximately $450 for lodging, meals, and personal expenses. T R 2:30–4:25 until midterm only. R. W. Blake and staff.

Oriented to provide students an opportunity to observe agricultural development in a tropical environment and promote interdisciplinary exchange among staff and students. The two-week field-study trip during January to Latin American countries is followed by discussions and assignments dealing with problems in agriculture and livestock production in the context of social and economic conditions.

INTAG 603 Administration of Agricultural and Rural Development (also GOVT 692)

Spring. 4 credits. M 2:30–5:30. N. T. Uphoff and T. W. Tucker.

An intercollege course designed to provide graduate students with a multidisciplinary perspective on the administration of agricultural and rural development activities in developing countries. The course is oriented to students in agricultural or social sciences who may have administrative responsibilities during their professional careers.

INTAG 685 Training and Development: Theory and Practice (also COMM 685, EDUC 685 and ILR 658)

Spring and summer. 4 credits. S-U grades optional. M. Kroma.

Analysis, design, and administration of training programs for the development of human resources in small-farm agriculture, rural health and nutrition, literacy as nonformal education, and general community development. Designed for scientists, administrators, educator-trainers, and social organizers in rural and agricultural development programs in the United States and abroad.

INTAG 694 Graduate Special Topics in INTAG

Fall or spring. 1–4 credits. S-U or letter option. Staff.

The department teaches "trial" courses under this number. Offerings vary by semester and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

INTAG 697–698 International Development M.P.S. Seminar

Fall, spring. 1 credit. S-U only. N. Uphoff.

A seminar for M.P.S. students to discuss important issues in international development and to prepare them to write their project papers. Specific content varies.

INTAG 699 International Agriculture and Rural Development M.P.S. Project Seminar

Fall, spring. 1 credit. S-U grade only. Required for, and limited to, M.P.S. IARD students or with permission of instructor. R. Blake.

The seminar provides students with the opportunity to develop and present their special projects. It also serves as a forum for discussion of current issues in low-income agricultural and rural development, with particular attention to interdisciplinary complexities.

INTAG 783 Farmer Centered Research and Extension (also EDUC 783)

Fall. 3 credits. S-U or letter option. M. Kroma and T. Tucker.

This course provides an introduction to participatory traditions in farming systems research, extension, evaluation of rural development, technology generation, gender analysis, participatory rural appraisal, and documentation of local and indigenous knowledge of community-based development. Case studies of farmer-centered research and extension provide a focus for analysis. Appropriate roles of researchers and extensionists as partners with farmers are examined. A major contribution of farmer-centered research and extensions is its potential to legitimize people's knowledge by enhancing their capacity to critically analyze their own problems, to conduct their own research, and to empower them to take direct action to solve those problems.

Related Courses in Other Departments

Related Courses in Other Departments

In addition to International Agriculture (INTAG) courses, there are a wide variety of other courses with an international focus. The following are suggested relevant courses:

Agricultural & Biological Engineering

How to Manage a Watershed (ABEN/GOVT 644)

Applied Economics & Management

International Trade and Monetary Economics (AEM 230)

*Global Agribusiness Management (AEM 329)

International Trade Policy (AEM 430)

*Food Marketing Colloquium (AEM 446/447)

Global Marketing Strategy (AEM 449)

Seminar on Agricultural Trade Policy (AEM 730)

Macro Policy in Developing Countries (AEM 763)

Agriculture & Life Sciences

*Agriculture Study Tour to Burgundy, France (ALS 402)

*Internship Opportunities in Burgundy, France (ALS 403)

Global Seminar (ALS 480)

Animal Science

Tropical Livestock Production (AN SC 400)

Tropical Forages (AN SC 403)

Asian Studies

Southeast Asia Seminar: Country Seminar (ASIAN 601)

Biology

Biology of the Neotropics (BIOEE 405)

Food, Agriculture, and Society (BIOEE 469)

The Healing Forest (BIO PL 348)

Communication

Communication in the Developing Nations (COMM 424)

Intercultural and Development Communication (COMM 612)

City & Regional Planning

Seminar in International Planning (CRP 671)

Seminar in Project Planning in Developing Countries (CRP 675)

Crop & Soil Science

Properties and Appraisal of Soils of the Tropics (CSS 471)

Ecology of Agricultural Systems (CSS 473)

Tropical Cropping Systems (CSS/INTAG 314)

Education

Comparative Studies in Adult Education (EDUC 483)

Farmer-Centered Research & Extension (EDUC/INTAG 783)

Food Science

International Postharvest Food Systems (FOOD 447)

Horticulture

Genetic Improvement of Crop Plants (HORT 403)

Nutritional Science

Nutritional Problems in Developing Nations (NS 306)

Integrating Food Systems and Human Needs (NS 380)

National and International Food Economics (NS 457)

International Nutrition Problems, Policy, and Programs (NS 680)

Natural Resources

Ecological Dimensions of Global Change (NTRES 350)

International Environmental Issues (NTRES 400)

Religion, Ethics, and the Environment (NTRES 407)

Principles and Practices of Agroforestry (NTRES/HORT 415)

Plant Breeding

Introduction to Plant Breeding (PL BR 201)

Genetic Diversity (PL BR 404)

Plant Pathology

Plant Diseases in Tropical Agriculture (PL PA 655)

Integrated Pest Management in Tropical Agriculture (PL PA 655)

Rural Sociology

Population Dynamics (RSOC 201)

International Development (RSOC 205)

Social Indicators, Data Management and Analysis (RSOC 213)

Comparative Issues in Social Stratification (RSOC 370)

Human Fertility in Developing Nations (RSOC 408)

Population and Environment (RSOC 410)

Population Policy (RSOC 418)

Migration and Population Redistribution (RSOC 430)

Social Impact of Resource Development (RSOC 440)

Society and Survival (RSOC 490)

Population, Environment, and Development in Sub-Saharan Africa (RSOC 495)

Sociological Theories of Development (RSOC 606)

The Sociology of "Third World" States (RSOC 725)

*Includes overseas travel

LANDSCAPE ARCHITECTURE

M. I. Adleman, S. Baugher, K. L. Gleason, H. W. Gottfried, P. H. Horrigan, R. Jaenson, D. W. Krall, L. J. Mirin, R. T. Trancik, P. J. Trowbridge, K. A. Wolf

LA 141 Grounding in Landscape Architecture
Fall. 4 credits. Limited to 15 students. Letter grade only. Cost of basic drafting equipment for the major plus materials for projects; about $250.
Introduction to the representation and design of landscapes and to working in a studio setting. Freehand drawing, measured drawing, and model making are used to understand design principles of the changing landscape.

LA 142 Grounding in Landscape Architecture
Spring. 4 credits. Limited to approximately 20 students; freshman landscape architecture majors or permission of instructor. Cost of basic drafting equipment and project supplies, about $250.
Fundamentals of landscape design applied to small-scale site-planning projects. Work in the studio introduces course participant to the design process, design principles, construction materials, planting design, and graphics.

LA 201 Medium of the Landscape
Fall. 5 credits. Limited to landscape architecture majors. Cost of basic drafting equipment, supplies, and fees, about $200; expenses for field trip, about $250.
This studio course emphasizes the design process and principles involved in organizing and giving form to outdoor space through the use of structures, vehicular and pedestrian circulation systems, earthform, water, and vegetation.

LA 202 Medium of the Landscape
Spring. 5 credits. Prerequisite: LA 201 with a grade of C or better. Cost of supplies and fees, about $250; expenses for field trip, about $250.
This course focuses on the role of materials in design, design theory, and design vocabulary associated with landscape architectural projects.

[LA 260 Pre-Industrial Cities and Towns of North America (also CRP 260 and CRP 666 and LA 666)
Fall. 3 credits. Offered alternate years. Next offered fall 2002.
Various American Indian civilizations as well as diverse European cultures have all exerted their influences on the organization of town and city living. The course considers how each culture has altered the landscape in its own unique way as it created its own built environments.]

LA 261 Urban Archaeology (also CRP 261)
Fall. 3 credits.
Urban archaeologists study American Indian, colonial, and nineteenth-century sites which now lie within the boundaries of modern cities. This course explores how urban centers evolve; what lies beneath today's cities; and how various cultures have altered the urban landscape. Students participate in a local archaeological excavation.

LA 262 Laboratory in Landscape Archaeology (also ARKEO 262)
Fall. 3 credits. Prerequisites: LA 261 or CRP 261 or permission of instructor.
Various American Indian civilizations and European cultures have all altered the landscape to meet the needs of their cultures. Students learn how to interpret the American Indian and Euro-American landscapes of specific archaeological sites by identifying and dating artifacts, studying soil samples, and creating site maps.

LA 263/547 American Indians, Planners, and Public Policy (also CRP 363/547)
Spring. 3 credits. Offered in alternate years.
Decisions made by public agencies and private enterprise too often lead to the flooding, polluting, strip-mining, or other destruction of American Indian reservations, archaeological sites, and burial grounds. The central focus of this course is how to address urban and regional problems without imperiling the cultural survival of minorities.

LA 282 The American Landscape
Fall. 3 credits.
An interdisciplinary study of the environmental and cultural history of the American landscape. Topics include the relation of landscape to culture, landscape use and ecological change, regional and national landscapes, and perceptions of landscape expressed in paintings, photographs, and literature.

LA 292 Creating a Second Nature
Spring. 3 credits. Prerequisites: none, but ARKEO 100, ANTHR 100, or CLASSICS/HISTORY OF ART 220 recommended. Offered alternate years.
What can archaeological investigation tell us about the landscape of cultures that spent much of their civic and private lives out of doors? This course introduces the evidence for the markets, parks, gardens, fields, and burial places central to daily life in the ancient Near East and Classical Worlds and formative of our current ideas of these landscapes.

LA 301 Integrating Theory and Practice I
Fall. 5 credits. Prerequisite: LA 202 with a grade of C or better. Cost of supplies and fees, about $250; expenses for field trip, about $250.
Course participants are engaged in the art and science of site-scaled design. This includes relating construction and planting details to concepts and program.

LA 302 Urban Design in Virtual Space
Spring. 5 credits. Cost of supplies and fees, about $250; basic expenses for field trip, about $250.
A sequence of projects introducing students to advanced skills in large-scale urban design, including 3-D computer modeling and digital design media as tools for shaping the form of the city.

LA 315 Site Engineering I
Spring. 3 credits. Prerequisite: permission of instructor.
Lectures and studio projects focusing on the professional skills and knowledge required to competently and creatively develop grading plans for project-scale site design.

LA 316 Site Engineering II
Fall. 2 credits. Prerequisite: LA 315 or permission of instructor.
Lectures and studio projects dealing with earthwork estimating; storm water management, site surveys, site layout, and horizontal and vertical road alignment.

LA 318 Site Construction
Spring. 5 credits. Prerequisite: permission of instructor.
The emphasis of this course is detail design and use of landscape materials in project implementation. Exploration of construction materials, including specifications, cost estimates, and methods used by landscape architects in project implementation are the foci for this course. The course includes lectures, studio problems, and development of drawings leading to construction documentation for a comprehensive project. Students develop a process of self criticism related to measured drawings specific to the comprehensive project. Course participants fabricate material prototypes in wood and metal.

LA 402 Integrating Theory and Practice: Community Design Studio
Spring. 5 credits. Prerequisite: LA 301 with a grade of C or better. Cost of supplies and fees, about $250; expenses for field trip, about $250.
This course engages the theory and practice of participatory community design through a real community service project. Students become knowledgeable about the theory and practice of community design while learning an array of techniques and tools. Participants gain an understanding of how to integrate meaningful public service with design invention and creativity, engage rigorous design research methods, and understand how institutional and community contexts influence design problem-solving. Students will be expected to work independently and collaboratively on team projects in a community. One class period per week will be designated for community fieldwork. Studio theme for 2001–2002 to be announced.

LA 403 Directed Study: The Concentration
Fall, spring. 1 credit. Prerequisite: any Landscape Architecture undergraduate students in their final year of study.

Working with their adviser, students create a written and visual paper that documents the concentration intent.

LA 410 Computer Applications in Landscape Architecture
Fall or spring. 3 credits. Offered to landscape architecture students only. Limited to 15 students.
This course is designed to develop a working knowledge of various computer software applications with emphasis on Autocad. The course explores other applications relative to land-use planning and the profession of Landscape Architecture.

LA 412 Professional Practice
Spring. 1 credit.
Presents the student with a comprehensive understanding of the role of the professional landscape architect and the problems and opportunities one may encounter in an office or in other professional situations. Topics discussed include practice diversity, marketing professional services, office and project management, construction management, computers in the profession, and ethics.

LA 486 Placemaking by Design
Spring. 3 credits. Permission of instructor. S-U grades optional.
This seminar provides an understanding of contemporary planning and landscape architectural design strategies that reaffirm and reclaim a sense of place. Readings and discussions focus on the theory and practice of placemaking as represented in the literature and in built works. The seminar addresses the following questions: What constitutes a place-based design approach and what distinguishes it from other more conventional design approaches? Who are the key players shaping the theory and practice of placemaking?

LA 490 Rome Wasn't Built in a Day
Spring. 3 credits.
In this electronic course, students learn about how the form and spatial structure of the city of Rome has evolved through time. Using the interactive CD-ROM *Layers of Rome* as a digital text, the course engages participants in the investigations of urban design in Rome both as a case study and as a vehicle for exploring concepts applicable to many contemporary cities worldwide. The material focuses on the intersection between historical studies of urban space, architectural geography, urban landscape formation, and the design of cities. Lectures, research, readings and exercises are developed using the *Layers of Rome* CD, web searches, digital networking, and various interactive learning technologies geared toward urban analysis and visual design media.

LA 491 Creating the Urban Eden: Woody Plant Selection, Design and Landscape Establishment (also HORT 491)
Fall. 4 credits. Prerequisites: major in horticulture or landscape architecture or permission of instructor. Cost of supplies, about $50; expenses for field trips, about $50.
This course focuses on the identification, uses, and establishment of woody plants in urban and garden settings. By understanding the environmental limitations to plant growth, students are able to critically assess potential planting sites, select appropriate trees, shrubs, vines, and ground covers for a given site, and learn about the principles and practices of site amelioration and plant establishment. Design followed by written specifications and graphic details is produced to implement these practices.

LA 492 Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment (also HORT 492)
Spring. 4 credits. Prerequisites: a passing grade in HORT/LA 491. Attendance limited to horticulture and landscape architecture majors or permission of the instructors. Limited to 48. Preregistration required.
The second half of this course continues to focus on the winter identification, uses and establishment of woody plants in urban and garden settings. Issues of site assessment and soil remediation are emphasized in addition to soil volume calculations, drainage and surface detailing and planting techniques. Students critically assess potential planting sites, select appropriate trees, shrubs, vines and ground covers for a given site. Design for specific sites followed by written specifications and graphic details are produced to implement these proposals. Students implement in a hands-on manner, site remediation and planting techniques they have learned by creating new landscapes that serve to integrate theory, principles and practices. Together, HORT/LA 491 and 492 constitute an integrated course.

LA 494 Special Topics in Landscape Architecture
Fall or spring. 1–3 credits; may be repeated for credit. S-U grades optional.
Topical subjects in landscape architectural design, theory, history, or technology. Group study of topics not considered in other courses.

LA 495 Green Cities: The Future of Urban Ecology (also CRP 495)
Fall. 4 credits.
Explores the history and future of the ecology of cities and their role in solving the present global ecological crisis. The politics, design, and economics of "green cities" are examined in terms of transportation, renewable energy, solid waste and recycling, land use, and the built environment.

LA 497 Individual Study in Landscape Architecture
Fall or spring. 1–5 credits; may be repeated for credit. Students must register with an Independent Study form (available in 140 Roberts Hall). S-U grades optional.
Work on special topics by individuals or small groups.

LA 498 Undergraduate Teaching
Fall or spring. 1–2 credits. Prerequisites: previous enrollment in course to be taught and permission of instructor. Students must register with an Independent Study form (available in 140 Roberts Hall).
Designed to give qualified undergraduates experience through actual involvement in planning and teaching courses under the supervision of department faculty.

LA 501 Composition and Theory
Fall. 5 credits. Limited to graduate students. Cost of drafting supplies and fees, about $250. Field trip about $250.
Basic principles of natural and cultural processes that form "places" in the landscape. Projects focus on design applied to the practice of landscape architecture: particularly the relationship between measurement, process, experience, and form at multiple scales of intervention.

LA 502 Composition and Theory
Spring. 5 credits. Limited to graduate students. Cost of drafting supplies and fees, about $250; expenses for field trip, about $250.
The studio focuses on the spatial design of project-scale site development. Students develop their expertise in applying the design theory, vocabulary, and graphic expression introduced in LA 501.

LA 505 Landscape Representation I
Fall. 3 credits. Prerequisites: concurrent enrollment in LA 501 or permission of instructor.
This course introduces students to both conventional and unconventional modes of landscape architectural design representation. Drafting, orthographic drawing, axonometric project, lettering, analysis and concept drawing are taught alongside more expressive modes of direct site study and representation.

LA 506 Graphic Communication II
Spring. 3 credits. Prerequisites: LA 505 and concurrent enrollment in LA 502 or permission of instructor.
An intermediate level course focused on modes of landscape representation from ideation to presentation. Representation modes may include freehand, process drawing, analysis and orthographic drawing; concept modelling; composite drawings; and visual books.

LANAR 524 History of European Landscape Architecture*
Fall. 3 credits.
*Offered through the College of Architecture, Art, and Planning.

LANAR 525 History of American Landscape Architecture*
Spring. 3 credits.
*Offered through the College of Architecture, Art, and Planning.

LA 545 The Parks and Fora of Imperial Rome
Spring. 3 credits. Prerequisites: advanced standing in a design field, classics or history of art, other disciplines, or by permission of the instructor.
This advanced seminar is seeking an interdisciplinary group of students in classics, art history, archaeology, landscape architecture, horticulture, and architecture to bring their knowledge of Latin, Greek, Italian, archaeology, drawing, design, or computer modeling to a collaborative study of the ancient fora and public parks depicted on the Severan Marble plan of Rome. Opportunity for a spring break trip to Rome.

LA 569 Archaeology in Preservation Planning and Site Design (also CRP 569)
Spring. 3 credits. Offered alternate years.
In response to federal, state, and local legislation, archaeology now plays an important role in design, planning, and land-use decisions. Students develop the research skills needed to complete environmental review projects and historic landscape plans.

LA 580 Landscape Preservation: Theory and Practice
Fall. 3 credits. Prerequisites: Limited to junior and senior undergrads, and graduate students.

This course examines the evolving practice of landscape preservation in the United States. Topics include the recent history of the discipline, methodology in documentation of historic landscapes, and important practitioners and notable projects. Format for the class is assigned readings and discussion, invited speakers, lectures, and a project documenting a local site.

LA 582 The American Landscape
Fall. 3 credits.
An interdisciplinary study of the environmental and cultural history of the American landscape. Topics include the relation of landscape to culture, landscape use and ecological change, regional and national landscapes, and perceptions of landscape expressed in paintings, photographs, and literature. Graduate students complete additional outside work and attend an additional class session.

LA 590 Theory Seminar
Spring. 3 credits.
Seminar in landscape design theory. For graduate students and seniors.

LA 598 Graduate Teaching
Fall or spring. 1–3 credits. Prerequisite: permission of instructor. Students must register with an Independent Study form. Staff.
Designed to give qualified students experience through involvement in planning and teaching courses under the supervision of faculty members. The experience may include leading discussion sections, preparing, assisting in desk critiques, and presenting lectures. There are assigned readings and discussion sessions on education theory and practice throughout the term. (Credit hours are determined by: 2 hours per week = 1 credit hour).

LA 601 Integrating Theory and Practice I
Fall. 5 credits. Limited to graduate students. Cost of supplies and fees, about $250.
The studio focuses on site-scaled projects that consider significant cultural and natural landscapes. Theories of landscape restoration, sustainable design, and landscape representation are explored through projects that derive form from site and place. The integration of site history and ecology and site construction supports an understanding and relationship between design and site.

LA 602 Integrating Theory and Practice II
Spring. 5 credits. Limited to graduate students. Cost of drafting supplies and fees, about $250; expenses for field trip, about $250.
The studio builds upon prior course work with an expectation that participants can creatively manipulate the program and conditions of a site, with increased emphasis on contemporary construction technology. The course focuses on the expression of design solutions that grow from and affirm an explicit sense of site and place. Social, cultural, physical, and historic factors and their relationship to site design and planning are critically explored through theory and practice.

LA 603 Directed Study: The Concentration
Fall, spring. 1 credit. Prerequisite: any Landscape Architecture graduate student in their final year of study.
Working with their adviser, students create a written and visual paper that documents the concentration intent.

LA 615 Site Engineering I
Spring. 3 credits. Prerequisite: permission of instructor.
Lectures and studio projects focusing on the professional skills and knowledge required to competently and creatively develop grading plans for project-scale site design.

LA 616 Site Engineering II
Fall. 2 credits. Prerequisite: LA 615 or permission of instructor.
Lectures and studio projects dealing with earthwork estimating, storm water management, site surveys, site layout, and horizontal and vertical road alignment.

LA 618 Site Construction
Spring. 5 credits. Prerequisite: permission of instructor.
The emphasis of this course is detail design and use of landscape materials in project implementation. Exploration of materials, including specifications, cost estimates, and methods used by landscape architects in project implementation are the foci for this course. The course includes lectures, short studio problems, and the development of drawings leading to construction documentation for a comprehensive project. Students develop a process of self-criticism related to measured drawings specific to the comprehensive project. Course participants fabricate material prototypes in wood and metal.

[LA 619 Advanced Site Grading
Fall. 2 credits. Limited to 10 students. Prerequisite: LA 315 or LA 615. Not offered 2001.
Grading skills and knowledge applied as a design component of site planning projects.]

LA 666 Pre-Industrial Cities and Towns of North America (also CRP 666)
Fall. 3 credits. Offered alternate years.
Various American Indian civilizations as well as diverse European cultures have all exerted their influences on the organization of town and city living. This course considers how each culture altered the landscape in their own way as they created their own built environments.

LA 680 Graduate Seminar in Landscape Architecture
Fall or spring. 1–3 credits. May be repeated for credit. Limited to graduate students. S-U grades optional.
Topical subjects in landscape architectural design, theory, history, or technology. Includes seminar topics and group study not considered in other courses.

LA 694 Special Topics in Landscape Architecture
Fall or spring. 1–3 credits; may be repeated for credit. S-U grades optional.
Topical subjects in landscape architectural design, theory, history, or technology. Includes group study of topics not considered in other courses.

LA 701 Urban Design and Planning: Designing Cities in the Electronic Age (also CRP 555)
Fall. 5 credits. Limited to graduate students. Cost of supplies and fees, about $250; expenses for field trip, about $250.
Application of urban-design and town-planning techniques to specific contemporary problems of city environments. Issues of urbanism are investigated and applied to physical design interventions and spatial typologies involving the street, square, block, garden, and park systems. 3-D computer modeling and digital design media are introduced as tools for urban design. This is a specially arranged collaborative studio with the Department of City and Regional Planning.

LA 702 Advanced Design Studio
Spring. 5 credits.
A capstone studio that provides the opportunity to explore issues in contemporary landscape architecture and to integrate related fields. Topics include the influences of culture, history, and criticism, as well as reinterpretations of engineering and representation.

LA 800 Master's Thesis in Landscape Architecture
Fall or spring. 9 credits.
Independent research, under faculty guidance leading to the development of a comprehensive and defensible design or study related to the field of landscape architecture. Work is expected to be completed in final semester of residency.

NATURAL RESOURCES

J. P. Lassoie, chair; R. A. Baer, M. B. Bain, B. L. Bedford, B. Blossey, T. Brown, L. E. Buck, E. Cooch, P. Curtis, D. J. Decker, J. Enck, T. J. Fahey, T. A. Gavin, J. W. Gillett, J. R. Jackson, B. A. Knuth, C. Kraft, M. E. Krasny, B. Lauber, R. A. Malecki, R. J. McNeil, E. Mills, S. Morreale, M. E. Richmond, L. Rudstam, R. Schneider, R. Sherman, P. J. Smallidge, C. R. Smith, P. Sullivan, J. B. Yavitt

Note: class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

NTRES 100 Principles of Conservation
Fall. 3 credits. Limited to first-year students specializing in natural resources. Letter grade only. M W F 9:05; 1 hr disc TBA. Staff.
The nature of natural resources, how they are managed, and their interactions with individuals and societies are considered. Case histories are used to illustrate both principles and practices. Emphasis is on management of renewable resources based on ecological and cultural perspectives.

NTRES 110 Introduction to the Field of Natural Resources
Fall. 3 credits. Limited to Natural Resource majors only. M W 9:05–9:55; lab, R 2:30–4:25. Letter grade only. R. Sherman and J. Lassoie.
This course provides a comprehensive overview of the modern field of natural resources and environment to new students. The course focuses on identifying the components of knowledge required to understand the Earth's natural resources and ecological systems, and to participate

intelligently in their conservation and management. Local case studies are used to introduce students to the scientific, ethical, and societal basis for protection and management of natural resources and environments. Students become actively engaged in data collection and analysis, use quantitative models to analyze and interpret data, explore the human dimensions of natural resource issues, and come to understand the complexities of the policy process and management strategies.

NTRES 201 Environmental Conservation
Spring. 3 credits. M W F 12:20; 1 hr disc sec TBA. T. Fahey.
At the beginning of the twenty-first century, our lives are increasingly touched by questions about environmental degradation at local, regional, and global scales. Business as usual is being challenged. This course stimulates students to go beyond the often simplistic portraits of the environmental dilemma offered by the mass media to gain a firmer basis for responsible citizenship and action on environmental issues.

NTRES 210 Introductory Field Biology
Fall. 4 credits. Limited to 90 students. Open to sophomores and juniors with an adviser in Natural Resources or by permission of instructor. Prerequisites: BIO G 101 and 102 or equivalent. 2 overnight weekend field trips required. Cost of field trips, approximately $12. Lec, W 9:05; labs, M W 1:25–4:25 or T R 1:25–4:25. T. Gavin and C. Smith.
Introduction to methods of inventorying, identifying, and studying plants and animals. Students are required to learn the taxonomy, natural history, and how to identify approximately 170 species of vertebrates and 80 species of woody plants. Selected aspects of current ecological thinking are stressed. The interaction of students with biological events in the field and accurate recording of those events are emphasized.

NTRES 212 People, Values, and Natural Resources
Spring. 3 credits. M W F 10:10–11:00. J. Tantillo.
Cultural and political context for natural resources conservation and management in North America. Historical basis is explored through analysis of North American environmental history, examining shifts in attitudes and conceptions of human relationships to natural resources and the environment. Key laws guiding policy, conservation, and management of natural resources are reviewed. Concepts underlying the study of human attitudes, behaviors, institutions, and decision-making processes related to natural resource conservation and management are introduced.

NTRES 301 Forest Ecology
Fall. 3 credits. Prerequisite: introductory biology. M W F 11:15. T. J. Fahey.
A comprehensive analysis of the distribution, structure, and dynamics of forest ecosystems. Topics include paleoecology of forests, ecophysiology of forest trees, disturbance, succession and community analysis, primary productivity, and nutrient cycling.

NTRES 302 Forest Ecology Laboratory
Fall. 1 credit. Cost of weekend trip approximately $30. Concurrent enrollment in NTRES 301 required. M 1:25–4:25. T. J. Fahey.
Field trips designed to familiarize students with the nature of regional forests and to provide experience with approaches to quantifying forest composition and its relation to environmental factors. Optional weekend field trips to Adirondacks and to the White Mountains, New Hampshire. Includes group research projects in local forests.

NTRES 303 Forest Management and Maple Syrup Production
Spring. 3 credits. Letter grades only. Lec, T R 10:10–11:00; lab R 12:20–4:25. Offered alternate years. Next offered spring 2002. T. J. Fahey.
A practical, field-oriented course emphasizing principles and practices of multiple purpose management of small, nonindustrial, private forest land in the northeastern United States, including the production of maple syrup.

NTRES 305 Applied Population Ecology
Fall. 3 credits. Letter grade only. Prerequisite: NTRES 210 and background in biology or ecology is strongly recommended; completion or concurrent enrollment in CALS math requirement. M W F 9:05–9:55. E. Cooch.
An in-depth analysis of the ecological factors influencing the natural fluctuation and regulation of animal population numbers. The course examines in detail models of single species and multi-species population dynamics, with emphasis on understanding the relationship between ecological processes operating at the individual level and subsequent dynamics at the population level. Computer and field-based exercises are used to reinforce concepts presented in lecture.

NTRES 306 Coastal and Oceanic Law and Policy
Summer. 2 credits. A special 1-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portmouth, N.H. For more details and an application, consult the SML office, G14 Stimson Hall. Staff.
Intended for students interested in careers in management of marine or coastal resources or in the natural sciences. Subjects include law and policy related to ocean dumping, marine sanctuaries, environmental impact statements, water and air pollution, fisheries management, offshore gas and oil production, and territorial jurisdiction. Lectures on the status and history of law are accompanied by discussion of relevant policy and efficacy of various legal techniques. A case study that requires extensive use of the laboratory's library and personnel is assigned. The week concludes with a mock hearing.

NTRES 308 Natural Resources Management
Fall. 3 credits. Prerequisite: junior standing. M W F 10:10. B. A. Knuth.
Focus is on terrestrial and aquatic resources. Concepts emphasized include the comprehensive planning process and human dimensions of resource management. Students integrate biological, social, and institutional dimensions of management through case studies. Grades are based on individual and group performance.

NTRES 309 Sovereign Tribal Environments
Summer. 1 credit. Prerequisite: none; recommended: one course each in Natural Resources and American Indian Program. Consult Cornell University Summer Session Catalog or the Summer Session and Continuing Education section of this book for scheduling information. S. M. Penningroth.
Under federal law, Native American tribes possess significant attributes of sovereignty. This course introduces American Indian territories as a unique policy arena where tribal jurisdiction and traditions merge with the goals of economic development and cultural survival to shape resource management decisions. Course includes lectures, class discussions, case studies, and a mandatory field trip to an Iroquois territory.

NTRES 321 Introduction to Biogeochemistry (also SES 321)
Fall. 4 credits. Prerequisites: college-level chemistry, plus a course in biology and/or geology. Lec, T R 12:20–1:10; lab, T or R 2:30–4:25. J. B. Yavitt and L. A. Derry.
Control and function of the Earth's global biogeochemical cycles. The course begins with a review of the basic inorganic and organic chemistry of biologically significant elements, and then considers the biogeochemical cycling of carbon, nutrients, and metals that take place in soil, sediments, rivers, and the oceans. Topics include weathering, acid-base chemistry, biological redox processes, nutrient cycling, trace gas fluxes, bio-active metals, the use of isotopic tracers, and mathematical models. Interactions between global biogeochemical cycles and other components of the Earth system are discussed.

NTRES 340 Quantitative Population Analysis
Spring. 3 credits. Prerequisites: college-level course in statistics or mathematics recommended. M W F 9:05–9:55. P. J. Sullivan.
The dynamics and demographics of aquatic and terrestrial populations are examined using statistical techniques and computer modeling. The course emphasizes: estimation of population abundance using statistical surveys, and other sampling techniques; and characterization of population dynamics through mathematical and statistical models representing the fundamental processes of birth, death, growth, and movement. Topics include applications to aquatic and terrestrial organisms of resource and conservation interest.

NTRES 350 Global Ecology and Management
Spring. 3 credits. Prerequisites: college-level courses in biology and chemistry. M W F 12:20–1:10, disc sec, M or W 1:25–2:15. J. B. Yavitt.
Human accelerated environmental changes threaten the integrity of nature. This course explains the ecological principles that comprise this threat. Topics include increasing air temperature, atmospheric carbon dioxide and other gases, and pollution. Discussions explore the likely future behavior of nature given different global change scenarios.

NTRES 370 Conservation of Birds
Spring or summer. 2 credits. Prerequisite: NTRES 210 or permission of instructor. Offered alternate years. Next offered spring 2002. C. R. Smith.
A course for majors and nonmajors, focusing on science-based bird conservation and management at the organism, population, community, and landscape levels. Current resource management issues relevant to birds are explored in the contexts of agricultural

practices, habitat management, tropical deforestation, the design and management of natural preserves, endangered species management, global climate change, and the economic importance of bird study as an outdoor recreational activity.

NTRES 371 Conservation of Birds Laboratory

Spring or summer. 1 credit. Concurrent enrollment in NTRES 270 required. Offered alternate years. Next offered spring 2002. C. R. Smith.

A field-oriented course designed to teach skills of bird observation and identification based on the integration of field marks, songs and calls, and habitat cues. Topics covered include the choice and effective use of field guides, binoculars, and other tools for bird identification; procedures for taking and organizing field notes; the relationships of birds to their habitats and to other birds; and methods and procedures for censusing and surveying songbird populations.

NTRES 400 International Environmental Issues

Fall. 4 credits. Prerequisite: junior standing or above. T R 10:10–12:05. R. McNeil.

A survey of current international environmental issues and the institutions through which we deal with them. Among subjects included are: biodiversity and endangered species, global climate change, Antarctica, Law of the Sea, parks and protected areas, and tourism. International organizations, such as World Bank, World Trade Organization, nongovernment environmental organizations, governments and their policies are studied. Laws and treaties are examined, as are negative forces such as corruption and colonialism. Lectures, discussion, term paper.

NTRES 402 Natural Resources Policy, Planning, and Politics

Spring. 3 credits. Prerequisites: junior standing; special application process, and course fee (approx. $375). Lec, January two-week intersession; two 2-hour orientation sessions in fall semester and four 2-hour sessions in February and March. Completed applications due by October 12. Applications are available by contacting map10@cornell.edu or at www.dnr.cornell.edu/courses/course.html. B. A. Knuth.

An introduction to the environmental policy process and its conceptual framework. Recognizing and defining natural resource or environmental problems and issues; aggregating interests; formulating and selecting alternative solutions; implementation and evaluation stages; roles of lobbyists, legislature, executive branch, and other actors. Case studies; presentations by and discussions with about twenty prominent Washington policy makers appearing as guest lecturers. Required interviews, term paper, and oral reports. Several meetings in Ithaca before and after intensive January session in Washington.

NTRES 406 Ecology Risk Assessment (also TOX 406)

Spring. 3 credits. Prerequisites: BIOES 261 or equivalent; permission of instructor if not an advanced student in natural sciences of engineering. M W F 11:15–12:05. J. W. Gillett.

This course strives to develop understanding of and competence in the different types of ecological (nonhuman health) risk assessments. Focus is on cases for chemical, physical, and biological stressors in a variety of circumstances. The proposed USEPA approach under development serves as the working model.

NTRES 407 Religion, Ethics, and the Environment

Fall. 4 credits. For juniors, seniors, and graduate students; others by permission only. S-U grades optional. T R 10:10–11:00; an hr disc TBA. R. A. Baer.

How religion, philosophy, and ethics influence our treatment of nature. Terms like religion, nature, fact, value, knowledge, and public interest are examined in detail. Particular themes include character and moral development, similarities and differences between moral and scientific claims, truth telling, public reason, and property. Also covers animals rights vs. ecosystem concerns, responsibility to future generations, the limitations of rationalism in ethics, and discussion of whether women approach moral issues differently than men.

[NTRES 408 Resource Management and Environmental Law (also CRP 444)

Fall. 3 credits. For juniors, seniors, and graduate students. S-U grades optional. M W F 9:05–9:55. Not offered fall 2001. Staff.

A senior-level course that introduces the use of legal concepts, doctrines, and remedies in natural resource and environmental management. For a variety of living resources and their habitats, it explores the common law and regulatory processes available for resolving conflicts between exploitation and protection and stresses a practical understanding of how public and private values, economic considerations, and constitutional limitations affect management techniques and objectives.]

NTRES 410 Quantitative Methods in Wildlife Management

Spring. 3 credits. Letter grade only. Prerequisite: NTRES 210, with NTRES 305, strongly recommended. Lec, T R 11:15–12:05; lab, R 2:30–4:25.

An in-depth analysis of the ecological and quantitative dimensions of decision making in modern wildlife management and conservation. This includes analysis of population and systems models for planning and evaluating management decisions, particularly under uncertainty, and methods for adaptive management, techniques which are increasingly important for resource management and conservation. Afternoon lab sessions use case studies, group discussion, and computer-based exercises to reinforce concepts presented in lecture.

NTRES 411 Seminar in Environmental Ethics

Fall. 3 credits. For seniors, juniors and graduate students. S-U grades optional. W 1:25–3:50.

Moral concerns relative to the natural environment and agriculture. Major themes generally include: animal rights vs. ecosystem concerns; natural resource management and the concept of the public interest; applying environmental ethics in a democratic and pluralistic society; how our treatment of one another parallels our treatment of nature; and land use ethics. Several classes focus on the nature of facts, values, knowledge, and truth telling.

NTRES 415 Principles and Practices of Agroforestry (also HORT 415 and CSS 415)

Fall. 3 credits. Prerequisites: senior or graduate standing or permission of instructor. S-U option. Lec, M W F 10:10–11:00. L. Buck, E. Fernandes, K. Mudge.

An introduction to modern and traditional agroforestry systems which involves spatial or temporal integration of multipurpose woody plants (trees and/or shrubs) with annual or perennial crops and/or livestock. Interactions between woody and non-woody components of agroforestry systems are considered, based on above- and below-ground processes. The sustainability of agroforestry systems is critically examined from biophysical, socioeconomic, and policy perspectives. Optional laboratory, NTRES 416 (also CSS and HORT).

NTRES 416 Principles and Practices of Agroforesty—Laboratory (also HORT 416 and CSS 416)

Fall. 1 credit. Optional lab component of NTRES 415 (also HORT and CSS [SCAS]). S-U grades optional. Prerequisites: junior, senior, or graduate standing or permission of instructor; prior or concurrent enrollment in NTRES 415. W 1:25–4:25. K. Mudge, E. Fernandes, L. Buck.

An integrated set of laboratory and field exercises designed to develop competency in diagnostic and management skills applied to agroforestry practice. Sessions include field trips to local practitioners as well as working demonstration farms and forests, case study design and analysis, use of computer-based sources of information, and practical skills with woody plants including identification, propagation, planting, pruning, and measurement.

NTRES 417 Wetland Resources

Summer. 2 credits. Prerequisite: 1 year of college biology. A special 1-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portmouth, N.H. For more details and an application, consult the SML office, G14 Stimson Hall.

An examination of coastal and adjacent freshwater wetlands from historical, disturbance, and preservation perspectives, including fresh and salt water-marsh ecology and management. Field trips to selected examples of the wetlands under discussion and follow-up laboratories emphasize successional features, plant identification and classification, and examination of the dominant insect and vertebrate associations.

NTRES 418 Wetland Ecology and Management-Lecture

Fall. 3 credits. T R 1:25–2:40. B. L. Bedford.

Examination of the structure, function, and dynamics of wetland ecosystems with an emphasis on principles required to understand how human activities affect wetlands. Current regulations, protection programs, and management strategies are considered.

NTRES 419 Wetland Ecology and Management-Laboratory

Fall. 1 credit. Optional. Concurrent enrollment in NTRES 418 is required. W or F 12:20–4:25. 1 weekend fieldtrip required.

An integrated set of laboratory field exercises designed to expose students to: the diversity of wetland ecosystems; the vegetation, soils, water chemistry, and hydrology of wetlands in the region; methods of sampling wetlands

vegetation, soils, and water; and methods of wetland identification and delineation.

NTRES 420 Ecological Management of Water Resources
Spring. 3 credits. Prerequisites: introductory ecology and introductory chemistry or permission of instructor. M W F 9:05–9:55. R. Schneider.
In-depth analysis of those ecological and biological principles relevant to the management of fresh and marine water resources, with emphasis on the effects of water management on community ecology. Lectures and discussion integrate scientific literature with current management issues. Topics include: linkages between hydrologic variability and communities; groundwater-surface connections, flow paths for dispersal, patchily distributed water resources, and water quality controls on organisms.

NTRES 428 Landscape Impact Analysis
Spring. 3 credits. Prerequisites: 1 introductory and 1 advanced course in ecology or the equivalents, and junior standing. T R 1:25–2:40. B. Bedford.
This course presents ecological concepts and analytical tools needed to evaluate environmental impacts to natural resources and ecosystems within an integrated context that incorporates the landscapes in which these resources occur. It explores diverse conceptual frameworks for landscape impact analysis and exposes students to modern tools for evaluating landscapes.

[NTRES 438 Fishery Management
Spring. 3 credits. Lec, T R 10:10; disc, T or R 11:15. Offered alternate years. Next offered spring 2003.
Introduction to management as an adaptive process that focuses on achievement of goals. Coverage includes sport and commercial fisheries and species restoration. Topics include goals and objectives, regulations, habitat management, population control, stocking and management of trout, reservoirs, and the Great Lakes and Pacific halibut. Ecological, social, political, and economic aspects of those topics are discussed.]

NTRES 450 Conservation Biology
Fall. 3 credits. Prerequisite: a reasonable biology background. Limited to first 30 seniors, plus graduate students. Lec, T 10:10–12:05; disc, R 10:10 or 11:15. T. A. Gavin.
Emphasis is on biological topics that are important to the maintenance of biological diversity. Examples include population viability analysis, and the analysis of the demography and genetics of small populations as they are affected by habitat fragmentation and isolation. Students gain thorough familiarity with these concepts and their potential application through lectures, discussion, and use of computer models. This course is intended primarily for students with a background in college biology. Students with no college biology background should enroll in BIOEE 257.

[NTRES 456 Stream Ecology (also ENTOM 456, BIOEE 456)
Spring. 4 credits. Limited to 60 students. Prerequisites: none; BIOEE 261 recommended. Offered alternate odd years. Next offered spring 2003. Lec T R 9:05–9:55; lab T W or R 1:25–4:25. B. Peckarsky.
Lecture addresses the patterns and processes occurring in stream ecosystems, including channel formation, water chemistry, watershed influences, plant, invertebrate, and fish community structure, nutrient cycling, trophic dynamics, colonization and succession, community dynamics, conservation, and the impacts of disturbances. Lab: field projects include descriptive and experimental techniques, hypothesis-testing, and writing of scientific papers related to environmental assessment.]

NTRES 458 Human Dimensions of Natural Resource Management
Spring. 3 credits. S-U grades optional. Limited to juniors and seniors. Lec, T R 11:40–12:55. B. Lauber and J. Enck.
This course focuses on how a social science-based understanding of human attitudes, values, and behaviors can be incorporated in natural resource management decisions and actions. Examples from federal, state, and nongovernmental fish, wildlife, and forest management programs are used to illustrate the importance of socioeconomic considerations in problem solving and decision making.

NTRES 459 Techniques for Demographic Analysis of Wildlife Population
Fall. 3 credits. Letter grade only. Prerequisites: CALS math requirements or permission of instructor. NTRES 305 and/or NTRES 340 suggested. Lec, T R 1:25–2:15; lab, W 1:25–4:25. Offered alternate years. E. Cooch.
This course explores the theory and application of a variety of statistical techniques in the study of population dynamics. Topics include the use of capture-recapture and recovery analysis to estimate survival probability, abundance (and density), immigration, emigration, population growth, and sensitivity analysis, using both open and closed population models. Also examined are inference methods including covariate analysis and model selection.

NTRES 460 Quantitative Ecology of Fisheries Resources
Spring. 3 credits. S-U grades optional. Prerequisites: NTRES 304 recommended or permission of instructor. M W F 10:10–11:00. Offered alternate even years. P. J. Sullivan.
The dynamics of marine and freshwater fisheries resources are examined with a view towards observation, analysis, and decision making within a quantitative framework. Growing pressure on fisheries' resources, habitat modification, and increased uncertainty about the nature of biological systems are at the center of many fisheries' issues. Quantitative models are useful for integrating information needed by decision makers in addressing these issues. The course develops analytical methods to assess the dynamics and status of fisheries' resources and then demonstrates how the information may be transformed into useful information for decision makers.

[NTRES 471 Ecoregions: Ecology and Conservation
Spring. 2 credits. Letter grade only. Prerequisites: NTRES 210, 305; statistics recommended; junior standing or above. Lec/Lab, W 1:25–4:25. Offered alternate odd years. Next offered 2003. C. R. Smith.
Approaches to characterizing and classifying terrestrial habitats and ecoregions at a variety of spatial scales are reviewed and discussed. A landscape approach is used to introduce habitat management concepts and land cover classifications. Legislation guiding federal land management decisions is discussed, and field trips go to areas managed by public and private land management organizations.]

NTRES 493 Individual Study in Resource Policy, Management, and Human Dimensions
Fall, spring, or winter. Credit TBA. S-U grades optional. Prerequisite: permission of instructor. R. A. Baer, T. Brown, L. E. Buck, D. J. Decker, J. Enck, J. Gillett, B. Knuth, T. B. Lauber, R. McNeil.
Topics in environmental and natural resource policy, management, and human dimensions are arranged depending on the interests of students and availability of staff. Students must register with an Independent Study form (available in 140 Roberts Hall).

NTRES 494 Special Topics in Natural Resources
Fall or spring. 4 credits maximum. S-U grades optional.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

NTRES 495 Individual Study in Fish and Wildlife Biology and Management
Fall or spring. Credit TBA. S-U grades optional. Prerequisite: permission of instructor. M. Bain, E. Cooch, P. Curtis, T. Gavin, J. R. Jackson, C. Kraft, R. Malecki, E. Mills, A. Moen, S. Morreale, M. Richmond, L. Rudstam, C. Smith, P. Sullivan.
Topics in fish and wildlife biology and management are arranged depending on the interests of students and availability of staff. Students must register with an Independent Study form (available in 140 Roberts Hall).

NTRES 496 Individual Study in Ecology and Management of Landscapes
Fall or spring. Credit TBA. S-U grades optional. Prerequisite: permission of instructor. B. Bedford, B. Blossey, T. Fahey, M. Krasny, J. Lassoie, R. Schneider, R. Sherman, P. Smallidge, J. Yavitt.
Topics in ecology and management of landscapes are arranged depending on the interests of students and availability of staff. Students must register with an Independent Study form (available in 140 Roberts Hall).

NTRES 498 Teaching in Natural Resources
Fall and spring. 1–4 credits. Prerequisite: permission of instructor. Students must register with an Independent Study form (available in 140 Roberts Hall). S-U grades optional.
Course designed to give students an opportunity to obtain teaching experience by assisting in labs, field trips for designated sections, discussions, and grading. Students gain insight into the organization, preparation, and execution of course plans through application and discussions with instructor.

NTRES 500 Professional Projects—M.P.S.
Fall and spring. Credit TBA. Limited to graduate students working on professional master's projects. S-U grades only.

NTRES 507 Environmental Inquiry (also EDUC 507)
Summer. 1–3 credits. S-U grades optional. Prerequisite: limited to preservice or inservice secondary science teachers. Permission of one of the instructors required. W. S. Carlsen and M. E. Krasny.
Exploration of selected topics in environmental science and environmental science education at the secondary school level. The subject-matter focus varies from year to year, and tracks ongoing research and development conducted through Cornell's Environmental Inquiry project, a collaboration between the Departments of Education and Natural Resources and the Center for the Environment. Current work centers on watershed dynamics, biodegradation, environmental toxicology, and invasive species.

NTRES 600 Introduction to Graduate Study in Natural Resources
Fall. 2 credits. Prerequisite: course is open to beginning graduate students whose faculty advisers are in Natural Resources. S-U grades. Lec, Weekdays TBA, 3:00–5:00. M. E. Krasny.
Designed for beginning Natural Resources graduate students, this course includes faculty-led discussions of key natural resources issues, student discussions of research ideas, and skill building sessions on proposal writing and giving research presentations. Students are required to complete a research proposal.

NTRES 601 Seminar on Selected Topics in Natural Resources
Fall or spring. 1 credit. S-U grades only. T 3:35–4:25; disc sec, T 4:30–5:00.
Selected readings and discussions of research and/or current problems in natural resources.

[NTRES 604 Seminar on Selected Topics in Resource Policy and Management
Fall. 2 credits. S-U grades only. M 3:00–4:30. Not offered in 2001–2002.
Primarily for graduate students with a major or minor in resource policy and management and upper level undergraduates with a strong interest in resource policy analysis. Topics include the policy process, actors and stakeholders, ethical dimensions, and evaluation. Emphasis is placed on discussion, faculty-student interaction, communication skills, and current resource policy issues.]

NTRES 605 Issues in Risk Analysis Seminar (also CEE 605)
Fall. 1 credit. Prerequisite: calculus, advanced course in statistics and basic natural sciences (Chemistry, Biology, Earth Systems). S-U only. Lec, TBA. J. Gillett and R. Davidson.
Discussion of current issues and ongoing research on risk analysis issues from many perspectives with an emphasis on environmental risk analysis. Speakers address problem formulation, quantitative/qualitative methods in assessment of risks, communication issues, and challenges to risk assessment methodologies. Some sessions held jointly with other seminar series. Enrollment in seminar requires short reports and participation in two required discussion meetings for class members designed to integrate the issues raised during the semester.

NTRES 607 Ecotoxicology (also TOX 607)
Spring. 3 credits. Prerequisites: graduate or senior status and two 300-level courses in chemistry, biological science, or toxicology. M W F 11:15–12:05. Offered alternate even years. J. W. Gillett.
Lectures, readings, and special guests focus on the principles of effects of toxic chemicals on natural ecosystems, their components, and processes. Major topics include fate and transport of chemicals (chemodynamics), comparative biochemical toxicology, ecosystem process analysis, simulation through mathematical and physical (microcosm) models, and relationships to regulation and environmental management.

NTRES 612 Wildlife Science Seminar
Fall and spring. 1 credit. Prerequisite: permission of instructor. S-U grades only. Check with department for availability. Staff.
Discussion of individual research or current problems in wildlife science.

NTRES 615 Case Studies and Special Topics in Agroforestry
Spring. 2 credits. Prerequisites: NTRES/CSS/HORT 415 or permission of instructor. S-U grades optional. W 1:25–3:20. L. E. Buck.
Interdisciplinary groups of students examine case study examples of agroforestry practice and research in developed and developing countries. Key current topics in the field are examined in depth, through lecture presentations, library research, and class discussion. Students prepare individual or team-written original case studies or critical analyses of existing case studies for presentation to class.

NTRES 616 Forest Science and Management Seminar
Fall. 2 credits. For graduate students and upper-level undergraduates. Time TBA, organizational meeting to be scheduled. J. B. Yavitt.
This seminar course includes review of current literature, student research, and selected topics of interest. Topics include biogeography, ecology, and human use of forests located in boreal, temperate, and/or tropical environments.

NTRES 618 Critical Issues in Conservation and Sustainable Development
Fall. 3 credits. Preference to graduate students with minor in conservation and sustainable development; seniors by permission. Limited to 30 students. T R 2:30–4:25. Staff.
Establishes a conceptual foundation for analyzing and addressing conservation and development issues from an interdisciplinary perspective. Engages students in the inherent conflicts between natural resource conservation and rural development. Students work in interdisciplinary groups to analyze issues and cases from both developing and developed countries.

NTRES 619 Field Practicum in Conservation and Sustainable Development
Spring. 3 credits. Prerequisites: NTRES 618; preference given to graduate students with minor in conservation and sustainable development; permission of instructor. Limited to 12 students. Includes 2-week field study trip to a Latin American country in January.
An interdisciplinary study of a conservation and development problem in Latin America. The course uses an interdisciplinary research methodology that includes group problem identification, individual or rapid appraisal projects, and synthesis of group work to identify key conservation and development issues and research priorities for a selected site.

NTRES 659 Techniques for Demographic Analysis of Wildlife Population
Fall. 3 credits. Letter grade only. Prerequisites: CALS math requirements or permission of instructor. Lec, T R 1:25–2:15 P.M.; lab, W 1:25–4:25 P.M. Offered odd years. E. Cooch.
This course explores the theory and application of a variety of statistical techniques in the study of population dynamics. Topics covered include the use of capture-recapture and recovery analysis to estimate survival probability, abundance (and density), immigration, emigration, population growth, and sensitivity analysis, using both open and closed population models. Also examined are inference methods including covariate analysis and model selection. Students enrolling for graduate credit do extra work beyond that expected for undergraduates in the 400-level course (NTRES 459).

NTRES 660 Quantitative Ecology of Fisheries Resources
Spring. 3 credits. S-U grades optional. Prerequisites: NTRES 304 recommended or permission of instructor. M W F 10:10–11:00. Offered even years. P. J. Sullivan.
This course is taught in conjunction with NTRES 460 (see description above). Students taking the course for graduate credit are asked, in addition to the 400-level projects and homework, to construct and document a model of population or community dynamics that reflects and extends the concepts covered in the course.

[NTRES 670 Spatial Statistics
Spring. 3 credits. Prerequisites: BTRY 601 and 602; an intro GIS course strongly recommended. S-U grades optional. M W F 10:10–11:00. Offered alternate odd years. Next offered spring 2003. P. J. Sullivan.
Spatial statistical concepts and techniques are developed and applied to ecological and natural resource issues. Topics include visualizing spatial data and analysis and modeling of geostatistical, lattice, and spatial point processes. Students should consider taking this course simultaneously with CSS 620.]

NTRES 694 Special Topics in Natural Resources
Fall or spring. 4 credits maximum. S-U grades optional.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

NTRES 698 Current Topics: Environmental Toxicology (also TOX 698)
Fall, spring. 1–3 credits. Prerequisites: graduate or senior standing in scientific discipline and permission of instructor.
A student-faculty colloquium on subjects of current interest, usually focusing on multidisciplinary aspects of topical problems (e.g., Superfund, oil spills).

NTRES 699 Graduate Individual Study in Natural Resources
Fall or spring. Credit TBA. S-U grades optional. Prerequisite: permission of instructor. NTRES graduate faculty.
Study of topics in natural resources more advanced than, or different from, other courses. Subject matter depends on interests of students and availability of staff.

NTRES 800 Master's Thesis Research
Fall and spring. Credit TBA. Limited to graduate students working on master's thesis research. S-U grades only.

NTRES 900 Graduate-Level Thesis Research
Fall and spring. Credit TBA. Limited to graduate students in a Ph.D. program **only before** the "A" exam has been passed. S-U grades only.

NTRES 901 Doctoral-Level Thesis Research
Fall and spring. Credit TBA. For students admitted to candidacy **after** the "A" exam has been passed. S-U grades only.

Related Courses in Other Departments

Courses in many other departments are relevant to students majoring in Natural Resources. The following list includes some of the most closely related courses but is not exhaustive.

Environment and Society (R SOC 208, 324, 340, 410, 440, 495)
Ecology and Biology (ENTOM 370, 456, 470, 471; BIOEE 261, 263, 274, 278, 452, 457, 459, 461, 462, 463, 465, 466, 468, 471, 472, 475, 476, 478; BIOMI 290–292, 397, 418)
Environmental Law, Ethics, and Philosophy (S&TS 206; CRP 390, 443, 444, 451, 453; PHIL 241, 246, 247, 381)
Human Systems and Communication (COMM 260, 285, 352, 421)
Physical Sciences (ABEN 151, 301, 371, 425, 435, 471, 473, 475, 478; CSS and EAS 260, 321, 365, 371, 398, 483; EAS 102, 104; CEE 432)
Public Policy and Politics (GOVT 427, 428; BIO & SOC 461; CEE 529)
Resource Economics (AEM 250, 450, 451)
Spatial Data Interpretation (CSS 411, 420, 620, 660)

PLANT BREEDING

T. Brutnell, W. R. Coffman, W. De Jong, J. Doyle, E. D. Earle, S. Kresovich, M. M. Jahn, S. R. McCouch, M. A. Mutschler, K. V. Raman, M. E. Smith, M. E. Sorrells, S. D. Tanksley, D. R. Viands, K. Watanable

Emeritus Professors: R. E. Anderson, H. L. Everett, H. M. Munger, R. P. Murphy, W. D. Pardee, R. L. Plaisted, D. H. Wallace

Note: class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

PL BR 201 Plants, Genes, and Global Food Production
Spring. 2 credits. Prerequisite: 1 year of introductory biology or permission of instructor. Lecs, T R 11:15. S. R. McCouch.
This course provides an introduction to plant breeding. It offers a sense of the historical and social importance of the field, tracing its evolution from the pre-scientific days of crop domestication to modern applications of biotechnology. It offers specific examples of how breeding objectives are realized and raises questions about the environmental, social, and economic consequences of intensive food production systems. This course may be used for partial fulfillment of the CALS distribution requirement GROUP B—Biological Sciences.

PL BR 225 Plant Genetics
Spring. 2 or 3 credits (2 credits if taken after BIOGD 281). Prerequisites: 1 year of introductory biology or equivalent; permission of instructor required for students who have taken BIOGD 281. Lecs, M W 11:15-12:05; lab, R 1:25–4:25. M. Jahn and M. Mutschler.
This course surveys the fundamentals of plant genetics. It shows how this information is used in plant biology and allied agricultural sciences and provides a basis for understanding the complex issues related to modern crop genetics. Topics include simple inheritance, linkage analysis, polyploidy, analysis of nuclear, chloroplast and mitochondrial genomes, pollination controls, and methods for analysis and manipulation of genes, chromosomes, and whole genomes. Examples and materials are drawn from diverse crops and plant species.

PL BR 401 Plant Cell and Tissue Culture
Fall. 3 credits. Prerequisites: a course in plant biology or genetics, or permission of instructor. Lecs, T R 10:10. E. D. Earle.
Lectures and demonstrations dealing with the techniques of plant tissue, cell, protoplast, embryo, and anther culture and the applications of those techniques to biological and agricultural studies. Methods for plant improvement via manipulations of cultured cells are discussed.

PL BR 402 Plant Tissue Culture Laboratory
Fall. 1 credit. Enrollment limited. Prerequisites: PL BR 401 (may be taken concurrently) or permission of instructor. W or R 1:25–4:25 (alternate weeks) plus 1 hr TBA. E. D. Earle.
Laboratory exercises complementing PL BR 401. Techniques for establishing, evaluating, and utilizing plant organ, tissue, and cell cultures are covered. Experiments use a broad range of plant materials and include *Agrobacterium*-mediated gene transfer.

PL BR 403 Genetic Improvement of Crop Plants
Fall. 3 credits. Prerequisites: genetics (BIOGD 281 or other standard genetics course), and a course in crops or horticulture. M W F 9:05–9:55. M. E. Smith.
Genetic enhancement of crop value to humans began with domestication and continues with farmers' variety development and scientifically trained plant breeders' applications of Mendelian, quantitative, and molecular genetics. This course examines crop genetic improvement methods by discussing the history and current practice of plant breeding, tools available to breeders, choices and modifications of those tools to meet specific objectives, and challenges plant breeders face in developing varieties for the future.

PL BR 404 Crop Evolution, Domestication and Diversity (also BIOPL 404)
Spring. 2 credits. S-U letter. Prerequisites: Genetics 281 or Plant Breeding 225 or permission of the instructor. Lecs, T R 9:05. S. Kresovich.
Evolution, domestication, and breeding of crop plants have molded the current diversity we conserve and use. Based on advances in systematics and molecular genetics, this course presents an integrated approach to understanding and describing diversity of agricultural and horticultural species. Underlying ethical, legal, and social issues affecting conservation and use also are addressed.

PL BR 446 Plant Cytogenetics Laboratory
Fall. 1 credit. S-U only. Prerequisites: a course in genetics or permission of instructor. Will be offered as a 2-week module at a time to be arranged in fall 2001. Check with department for further information. K. N. Watanabe.
This course aims to provide fundamental knowledge and techniques in plant cytogenetics. Emphasis is on applications to research on plant genetics and plant breeding. Plant materials involve a wide range of crop species. Basic techniques for examination of plant chromosomes are covered.

PL BR 494 Special Topics in Plant Breeding
Fall or spring. 4 credits maximum. S-U grades optional.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

PL BR 496 Internship in Plant Breeding
Fall or spring. Credits variable, may be repeated to a maximum of 6. Minimum of 60 on-the-job hours per credit granted. Prerequisites: permission of adviser and enrollment during the pre-enrollment period of the semester before the internship. Student must be a plant breeding junior or senior with a minimum 3.0 average in plant breeding courses. Students must attach to their course enrollment materials a "CALS Independent Study, Research, Teaching, or Internship" form signed by the faculty member who will supervise their study and assign their credits and grade. S-U grades only. Staff.
On-the-job learning experience under the supervision of professionals in a cooperating organization. A learning contract is written between the faculty supervisor and student, stating the conditions of the work assignment, supervision, and reporting.

PL BR 497 Individual Study in Plant Breeding
Fall or spring. Credits variable, may be repeated to a maximum of 6. S-U optional. Prerequisite: permission of instructor. Students must register with an Independent Study form (available in 140 Roberts Hall). Staff.

PL BR 498 Undergraduate Teaching
Fall or spring. Credits variable, may be repeated to a maximum of 6. S-U optional. Prerequisites: permission of instructor, and previous enrollment in course to be taught or equivalent. Students must register with an Independent Study form (available in 140 Roberts Hall). Staff.
Undergraduate teaching assistance in a plant breeding course. Teaching experience may include leading a discussion section, preparing and teaching laboratories, and tutoring.

PL BR 499 Undergraduate Research
Fall or spring. Credits variable. S-U optional. Prerequisite: permission of instructor. Students must register with an Independent Study form (available in 140 Roberts Hall). Staff.
Undergraduate research projects in plant breeding.

PL BR 604 Methods of Plant Breeding Laboratory
Fall. 2 credits. Prerequisite: PL BR 403 or equivalent (may be taken concurrently). T R 1:25–4:15. M. E. Sorrells and R. E. Anderson.
Field trips to plant breeding programs involve discussion of breeding methods used, overall goals, selection and screening techniques, and variety and germ plasm release. Additional labs include use of computers in plant breeding research and selection techniques for disease resistance. For a term project each student designs a comprehensive breeding program on a chosen crop.

PL BR 606 Advanced Plant Genetics
Spring. 3 credits. S-U grades optional. Prerequisites: BIOGD 281 or equivalent. Lecs, T R 1:25–2:40. W. S. De Jong.
Provides an advanced survey of genetics in higher plants. Topics include discussion of the complete genome sequence of Arabidopsis, forward and reverse genetic analyses of biochemical and developmental pathways, mating behavior and barriers, polyploidy, transposable elements, and the relationship between nuclear and chromosome structure and gene expression.

PL BR 607 Analysis of Sequence Similarity
Fall. 1 credit. Enrollment limited. S-U grades only. Prerequisites: basic biology, basic genetics, familiarity with computers. Permission of instructor required. M W F 11:15–12:05 for 4 weeks. Dates TBA. Check with Plant Breeding Office after June for details. D. Schneider.
This course focuses on the tools available for accessing nucleotide and protein sequence similarity in plants, animals, and microbes and the strengths and limitations of these approaches for answering biological questions. The mathematical and statistical background of the algorithms is presented in lectures, and weekly on-line projects provide students with experience in addressing a range of biological problems involving sequence analysis.

[PL BR 610 Advanced Plant Breeding Methods
Spring. 3 credits. Prerequisites: PL BR 403 or equivalent, BIOGD 281 or equivalent. M W F 12:20–1:10. Not offered 2001–2002. M. Mutschler.
This course integrates information from a variety of disciplines to examine current issues in plant breeding. Topics covered include: issues surrounding the maintenance, selection, and use of germplasm resources; traditional plant breeding methods used for a variety of crops; integration of biochemical and molecular techniques into an applied breeding program; the effect of crop and breeding objectives on the success of breeding strategies; and intellectual property protection and its impact on breeding goals and strategies.]

[PL BR 618 Breeding for Pest Resistance
Fall. 2 credits. S-U grades optional. Prerequisites: BIOGD 281 and PL BR 403 or equivalents. An introductory course in Plant Pathology and/or Entomology also highly recommended. Lecs, M F 2:30–3:20. Offered alternate years. P. Griffiths.
A multidisciplinary examination of the challenge of incorporating disease and insect resistance into crop plants. Topics covered include national and international germplasm collections, identification of sources of resistance, resistance mechanisms in plants, monogenic and polygenic control of resistance, approaches to breeding for resistance, stability of genetic resistance mechanisms, and the use of biochemical, physiological, and molecular tools in breeding for pest resistance.]

PL BR 622 Seminar
Fall or spring. 1 credit. S-U grades only. T 12:20–1:10. Staff and graduate students.

PL BR 650 Special Problems in Research and Teaching
Fall or spring. 1 or more credits. Prerequisite: permission of instructor supervising the research or teaching. Staff.

PL BR 653.2 Plant Biotechnology (also PL PA 663 and BIO PL 653.2)
Fall. 1 credit. S-U grades optional. Prerequisite: BIO PL 653.1 or permission of instructor. Lecs, M W F 1:25–2:15 (12 lecs) Oct. 1–Oct. 29. E. D. Earle and M. Zaitlin.
This course deals with production and use of transgenic plants for agricultural and industrial purposes. Topics include procedures for gene introduction and control of gene expression, as well as strategies for obtaining transgenic plants that are resistant to insects, diseases, and herbicides, produce useful products, or have improved nutritional and food processing characteristics. Regulatory and social issues relating to plant biotechnology are discussed.

[PL BR 653.3 Plant Genome Organization (also BIO PL 653.3)
Fall. 1 credit. S-U grade or letter option. Prerequisites: BIO PL 653.1. M W F 10:10–11:00. (12 lecs) Offered alternate years. Not offered 2001–2002. S. D. Tanksley.
The structure and variation of plant nuclear genomes, including changes in genome size, centromere/telomere structure, DNA packaging, transposable elements, genetic and physical mapping, positional gene cloning, genomic sequencing, and comparative genomics.]

PL BR 653.6 Molecular Breeding (also BIOPL 653.6)
Fall. 1 credit. S-U grade or letter option. Lecs, M W F 10:10–11:00 (12 lecs) Oct. 1–Oct. 29. Offered alternate years. S. Tanksley.
Application of DNA markers to the identification, manipulation and isolation of genes important to plant and animal productivity using molecular genetic techniques. Students learn how to design and execute experiments to identify quantitative trait loci (QTLs), as well as how to apply molecular markers to plant and animal breeding programs.

PL BR 694 Special Topics in Plant Breeding
Fall or spring. 4 credits maximum. S-U grades optional.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

PL BR 694.1 Intellectual Property Management for Plant Scientists
Spring. 3 credits. S-U grades optional. Prerequisite: functioning knowledge of plant sciences or permission of instructor. Lecs, W 1:25–4:25. A. F. Krattiger and R. D. Kryder.
A comprehensive introductory course for plant scientists and research administrators on the management of intellectual property (IP) and institutional IP strategies. Topics include: plant patents and utility patents (US and ex-US); plant variety protection/Plant Breeders' Rights; contracts and agreements (confidentiality, employment, material transfer, collaboration, consulting, licensing); technology valuation; IP management and strategies (laboratory notebooks, institutional management, Freedom-to-Operate reviews, IP audits, portfolio management); bioprospecting and genetic resource issues; and negotiation and litigation.

[PL BR 716 Perspectives in Plant Breeding Strategies
Spring. 3 credits. S-U grades optional. Prerequisite: PL BR 403. W 3:35–5:15, F 3:35–4:25. Next offered spring 2003. M. E. Sorrells.
Emphasis is on discussion and evaluation of selected benchmark papers and current literature. Selection techniques and breeding objectives, methods, and strategies for both self- and cross-pollinated crops are reviewed and discussed. Extensive outside reading is required.]

PL BR 717 Quantitative Genetics in Plant Breeding
Spring. 3 credits. S-U grades optional. Prerequisites: PL BR 403 and BTRY 601 or equivalent. M F 2:55–4:10. Offered even years. D. R. Viands and M. E. Sorrells.
Discussion of quantitative genetics and quantitative trait loci (QTLs) for more efficient plant breeding. Specific topics include: components of variance (estimated from various mating designs); theory and computer analysis for QTL, population structure, multiple locus regressions, and interval analysis; heritability; theoretical gain from selection; and genotypic and phenotypic correlation coefficients. During one period, plants in the greenhouse are evaluated to provide data for computing quantitative genetic parameters.

PL BR 726 Problems and Perspectives in Computational Molecular Biology (also CS 726)
Fall, spring. 1 credit. S-U only. Prerequisites: permission of the instructor. Disc, W 2:55. R. Elber and S. McCouch.

A weekly seminar series discussing timely topics of Computational Molecular Biology. This course addresses methodological approaches to gene annotation, protein structure and function relationships, and evolutionary relationships across species. Statistical and deterministic computational approaches are covered (e.g. psi-Blast, Hidden Markov Models, Threading, Evolutionary models), and specific and detailed biological examples are discussed.

PL BR 800 Master's-Level Thesis Research
Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty.
For students working on a master's thesis.

PL BR 900 Graduate-Level Dissertation
Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty.
For students in a Ph.D. program **only before** the "A" exam has been passed.

PL BR 901 Doctoral-Level Dissertation Research
Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty.
For students admitted to candidacy **after** the "A" exam has been passed.

PLANT PATHOLOGY

R. Loria, chair; J. R. Aist, P. A. Arneson, S. V. Beer, G. C. Bergstrom, B. B. Brodie, A. R. Collmer, T. P. Delaney, W. E. Fry, S. M. Gray, K. T. Hodge, G. W. Hudler, J. A. Laurence, S. G. Lazarowitz, J. W. Lorbeer, G. B. Martin, M. T. McGrath, M. G. Milgroom, E. B. Nelson, B. G. Turgeon, M. Zaitlin, T. A. Zitter

Note: class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

PL PA 101 Freshman Writing Seminar: Pests, Pesticides, People, and Politics
Spring. 3 credits. Limited to 17 students. Lecs, M W F 8:00. P. A. Arneson.
This seminar examines the use of pesticides, their impact on human health and the environment, and their regulation. Beginning with Rachael Carson's classic *Silent Spring*, the course examines many facets of the pesticide controversy through readings in current popular literature, technical journals, government documents, industry propaganda, and publications of various so-called "public interest groups." The need for critical thinking is emphasized as students explore the power of the written word to persuade.

PL PA 201 Magical Mushrooms, Mischievous Molds
Spring. 2 credits. S-U optional. Lecs, T R 11:15. G. W. Hudler.
A presentation of the fungi and their roles in nature and in shaping past and present civilizations. The historical and practical significance of fungi as decayers of organic matter, as pathogens of plants and animals, as food, and as sources of mind-altering chemicals are emphasized.

PL PA 241 Plant Diseases and Disease Management
Spring. 4 credits. Prerequisite: one year of biology. Lecs, M W F 11:15; lab, T or W 1:25. W. E. Fry.
An introduction to plant diseases, their diagnosis, and their management. Topics covered include: fungi, bacteria, viruses, nematodes, and other plant pathogens; disease cycles, plant disease epidemiology, disease forecasting, and the principles and practices of plant disease management. This course is intended for students who want a practical knowledge of plant diseases and their control. It is not an adequate prerequisite for plant pathology courses numbered 600 and above.

PL PA 309 Introductory Mycology
Fall. 3 credit. Prerequisite: 1 year of biology. Concurrent registration in PL PA 319 is recommended. Lec, T R 9:05–9:55; lab R 1:25–4:25. K. T. Hodge.
A survey of the astounding kingdom of fungi, including mushrooms, molds, yeasts, athlete's foot, fairy rings, and the blue stuff in blue cheese. The course covers fungal biodiversity and systematics, how fungi work, and their roles in the environment and in human affairs. Students work with preserved and living fungi and learn basic identification skills. Grades are based on two prelims, a final exam, and a culture collection project.

PL PA 319 Field Mycology
Fall, weeks 1–8. 1 credit. Letter grades only. Lab, W 1:25–4:25 and W 7:30–9:25 P.M. K. T. Hodge.
Learn to identify mushrooms and other macrofungi on a series of eight afternoon field trips followed by evening lab sessions. Fungi are collected during afternoon trips to sites around Ithaca. In the evenings, students use technical keys and microscopes to identify the fungi and learn about their ecology. The course runs only the first eight Wednesdays of Fall semester. Grades are based on a collection projection and a final laboratory examination.

PL PA 401 Basic Plant Pathology
Fall. 4 credits. Prerequisite: 1 year of biology and BIO PL 241 or equivalent. Recommended: general microbiology, plant physiology. Lecs, T R 11:15, F 12:20; lab, T or W 1:25. M. G. Milgroom.
Principles and practice of plant pathology. Lectures and labs are coordinated to consider types of plant pathogens and their population dynamics, disease cycles, diagnostic criteria and procedures, mechanisms of pathogen attack and plant defense, vector relationships, epidemiology, disease forecasting, loss assessment, and disease control. This course prepares students for graduate-level work in plant pathology.

PL PA 407 Nature of Sensing and Response: Signal Transductions In Biological Systems (also BIO BM 407)
Spring. 3 credits. Prerequisites: BIO BM 330 or 333 or 331 and previous or concurrent registration in 332. Recommended: BIO GD 281. Lec, T R 10:10–11:25. T. P. Delaney.
The responses of organisms and cells to their surroundings are examined to illustrate how biological systems sense their biotic and abiotic environment and communicate sensing into appropriate responses. A wide variety of response systems are explored to identify their unique features and to illustrate how similar processes are utilized by widely divergent organisms. Examples are drawn from prokaryote, plant and animal systems for environmental sensing, control of development and responses during disease. Discussion also examines the role of genetics and biochemistry in understanding signal transduction pathways, as well as the way these systems are perturbed by mutation and disease.

PL PA 411 Plant Disease Diagnosis
Fall. 3 credits. Limited to 18 students. Prerequisites: PL PA 241 or equivalent and permission of instructor. Lec, T R 10:10; lab T R 1:25–4:25. Offered alternate years. G. W. Hudler.
A method of diagnosing plant diseases caused by infectious and noninfectious agents is taught with emphasis on application of contemporary laboratory techniques and effective use of the literature. After seven weeks of formal lecture and laboratory sessions, students spend the rest of the semester working on their own to determine the causes of plant diseases on samples that have either been received by the Plant Disease Diagnostic Lab or that have been prepared by instructors.

[PL PA 443 Pathology and Entomology of Trees and Shrubs (also ENTOM 443)
Fall. 4 credits. Limited to 30 students. Prerequisites: PL PA 241 or equivalent, ENTOM 212 or equivalent. Lec, M W F 11:15; lab F 1:25–4:25. Offered alternate years. Next offered 2002. G. W. Hudler, P. A. Weston.
For students preparing for careers in horticulture, urban forestry, natural resources, and pest management. Deals with identification, impact, assessment, biology, and management of insects and diseases that damage trees and shrubs. Emphasis is on pests of northeastern flora but examples from other parts of the country and the world are also used. Forest, shade, and ornamental plants are considered.]

PL PA 444 Integrated Pest Management (also ENTOM 444)
Fall. 4 credits. Prerequisites: BIO ES 261, ENTOM 212 or 241, or PL PA 241 or their equivalents or permission of instructor. P. A. Arneson and J. Losey.
Lectures integrate the principles of pest control, ecology, and economics in the management across multiple systems. Laboratories consist of exercises to reinforce concepts presented in lecture and demonstrate pest monitoring techniques and the application of computer technology to management problems.

PL PA 472 Microbial Control of Plant Diseases
Spring. 3 credits. Limited to 20 students. Prerequisites: PL PA 241 or PL PA 401, BIOMI 290, or equivalent. Lecs, M W F 9:05–9:55. E. B. Nelson.
This course is intended to provide students with a broad exposure to the field of biological disease control. The basic ecological concepts and principles underlying microbial interactions with plants, as well as plant pathogens, and the role of these interactions in the suppression of fungal and bacterial diseases are discussed. Emphases is placed equally on biological control processes in rhizosphere and phylloplane habitats. Topics address aspects of root and leaf

microbial ecology, plant pathogen ecology and behavior, ecological and molecular mechanisms of biological disease control, and manipulation and enhancement of biological control processes. Applied aspects such as delivery approaches, commercialization and registration of biological control organisms, and implementation of biological disease control practices in agriculture are also covered.

PL PA 494 Special Topics in Plant Pathology
Fall or spring. 4 credits maximum. S-U grades optional.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

PL PA 497 Independent Study
Fall or spring. 1–5 credits. Students must register with an Independent Study form (available in 140 Roberts Hall). S-U grades optional.
An opportunity for independent study of a special topic in mycology or plant pathology under the direction of a faculty member.

PL PA 498 Teaching Experience
Fall or spring. 1–5 credits. Students must register with an Independent Study form (available in 140 Roberts Hall). S-U grades optional.
Undergraduate teaching assistance in a mycology or plant pathology course by mutual agreement with the instructor.

PL PA 499 Undergraduate Research
Fall or spring. 3–5 credits. Students must register with an Independent Study form (available in 140 Roberts Hall). S-U grades optional.
An opportunity for research experience under the direction of a faculty member.

PL PA 642–661 Special Topics Series
Unless otherwise indicated, the following description applies to courses 642–661.
Fall or spring. 1 credit. Prerequisite: permission of instructor. S-U grades only.
Weekly discussions of current topics in special areas of plant pathology and mycology. Students are required to do extensive reading of current literature and to present oral and written reports.

PL PA 642 Plant Disease Epidemiology
Fall. TBA. M. G. Milgroom.

PL PA 644 Ecology of Soil-Borne Pathogens
Fall. R 12:20. E. B. Nelson.

PL PA 645 Plant Virology
Fall. F 12:20. S. M. Gray.

PL PA 647 Bacterial Plant Diseases
Fall and spring. M 9:05. S. V. Beer.
Emphasizes current research in phytobacteriology undertaken in laboratories at Cornell.

[PL PA 648 Molecular Plant Pathology
Fall. R 12:20. Not offered 2001.
T. P. Delaney.]

[PL PA 649 Mycology Conferences
Fall. 1 credit. TBA. Not offered 2001.
K. T. Hodge.]

PL PA 650 Diseases of Vegetable Crops
Fall. TBA. Hours TBA. J. W. Lorbeer and T. A. Zitter.

[PL PA 652 Field Crop Pathology
Spring. W 8:00. Not offered 2001–2002.
G. C. Bergstom.]

PL PA 655 Integrated Pest Management in Tropical Agriculture (also ENTOM 644)
Spring. T 12:20. P. A. Arneson.

PL PA 661 Diagnostic Lab Experience
Summer and fall. 1 or 2 credits. S-U grades only. Requires 3 hrs/wk per credit hour. Hours TBA. T. A. Zitter.
For graduate students and advanced undergraduates with a special interest in diagnosing plant diseases. Students work in the Diagnostic Laboratory (Plant Pathology Department) under supervision of the diagnostician. Coursework or experience in diagnostic techniques is strongly advised. Priority is given to graduate students in plant pathology and plant protection.

PL PA 662 Molecular Plant-Pathogen Interactions (also BIOPL 652.1)
Spring. 1 credit. Prerequisites: BIOGD 281, BIOBM 330 or 331, and BIOMI 653.1. Lecs, M W F 10:10 (12 lecs) Jan. 21–Feb. 15. T. P. Delaney, A. R. Collmer, S. G. Lazarowitz.
An examination of the molecular properties that control the development of host-parasitic interactions in both microorganisms (bacteria, viruses, and fungi) and higher plants. Contemporary theories describing the genetic and molecular mechanisms of microbial pathogenesis and plant resistance are discussed.

PL PA 663 Plant Molecular Biology 1
Fall. 1–5 credit. Prerequisites: BIO GS 281, BIO BM 330 or 331.

Section 01 Concepts and Techniques in Plant Molecular Biology (BIO PL 653.1)
1 credit. Lec, M W F 10:10 (12 lecs). Sept 3–Sept 28. T. P. Delaney, G. B. Martin.
This is an introductory module that provides a broad overview of molecular biology concepts relevant to the plant sciences, and serves as a prerequisite to other modules in the BIO PL 653 (Fall) and BIO PL 652 (Spring) series. The course is divided into two sections: 1) gene discovery, which covers genetic, molecular, and genomics approaches to the isolation of plant genes; and 2) gene characterization, which covers DNA sequencing, DNA and RNA blotting, use of gene databases, and various approaches to producing transgenic plants. Emphasis is on understanding the appropriate approach that is needed for different experiments.

Section 02 Plant Biotechnology (BIO PL 653.2 and PL BR 653.2)
1 credit. Lecs, M W F 1:25 (12 lecs) Oct. 1–Oct. 29. M. Zaitlin, E. D. Earle.
This course deals with production and uses of transgenic plants for agricultural and industrial purposes. Topics include procedures for gene introduction and control of gene expression, as well as strategies for obtaining transgenic plants that are resistant to insects, diseases, and herbicides, produce useful products, or have improved nutritional and food processing characteristics. Regulatory and social issues relating to plant biotechnology are discussed.

PL PA 681 Plant Pathology Seminar
Fall and spring. 1 credit. Required of all plant pathology majors. S-U grades only. W 12:20–1:10.

PL PA 694 Special Topics in Plant Pathology
Fall or spring. 4 credits maximum. S-U grades optional.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

PL PA 701 Concepts of Plant Pathology: Organismal Aspects
Spring. 3 credits. For graduate students with majors or minors in plant pathology; others by permission. Prerequisites: PL PA 401 or equivalent and permission of instructor. Lecs, T R 9:05; lab/disc, R 2–4:25. A. R. Collmer.
Concepts in host-pathogen relationships with emphasis on roles of molecules and cells in determining the outcome of an interaction. Genetic, molecular biological, physiological, and cell biological approaches to experimental analysis of exemplary host-pathogen systems are considered. Historical perspectives and recent research are reviewed and analyzed. Students prepare and review mock grant proposals.

PL PA 702 Concepts of Plant Pathology: Population Aspects
Fall. 3 credits. For graduate students with a major or minor in plant pathology; others by permission. Prerequisite: PL PA 401 or permission of instructor. Some background in statistics is recommended.
Lab=discussion section. Lec, T R 10:10; disc, T 2–4:25. M. G. Milgroom.
Theory and concepts in population biology, with emphasis on evolution and epidemiology of plant pathogens. Interactions of plant and pathogen populations are considered within a population biology framework that integrates evolution, genetics, and ecology. The discussion section is used for examining current research literature and other exercises complementary to lecture topics; emphasis is on critical thinking in science.

PL PA 705 Phytovirology
Spring. 2 credits. For graduate students with a major or minor in plant pathology; others by permission. Prerequisite: PL PA 401 or equivalent. S. G. Lazarowitz.
This course considers plant viruses and the diseases they cause. Consideration is given to virus structure and composition, classification, replication, effects on hosts, modes of transmission, and the relationships of these aspects to principles of diagnosis and control.

[PL PA 707 Phytobacteriology
Fall. 2 credits. Prerequisites: general microbiology, lectures and laboratory; introductory plant pathology. Not offered 2001–2002. S. V. Beer.
A consideration of the prokaryotes that cause disease in plants and examples of the diseases they cause. The course emphasizes properties of bacterial pathogens that affect disease, methods for manipulation of the pathogens, and recent developments in phytobacteriology. The current state of knowledge of important phytopathogenic

genera including their genetics and mechanisms of pathogenesis is reviewed. Laboratory practice in isolation, inoculation, identification, genetics, and physiology is included.]

PL PA 709 Phytomycology
Spring. 2 credits. For graduate students with a major or minor in plant pathology or mycology; others by permission. Prerequisites: PL PA 401 and 309 or equivalents, or permission of instructor. Lec, F 1:25–2:30; lab, 2:30–4:30. J. W. Lorbeer.
Provides basic information on the biology of plant pathogenic fungi with emphasis on the structure, ecology, genetics, life cycles, and disease cycles of representative genera and species.

PL PA 738 Filamentous Fungal Genomics and Development
Fall. 2 credits. Prerequisite: BIOGD 281 or equivalent. B. G. Turgeon.
Molecular genetic and genomic approaches to the study of fungal biology. Applications of contemporary methodology to genetic dissection of developmental processes, such as plant pathogenesis (including host and tissue specificity) and reproduction, both sexual and asexual, are described. Experimental evidence supporting various hypotheses to explain fungal pathogenicity is evaluated. Examples are chosen from investigations of model plant pathogenic fungi such as *Cochliobolus heterostrophus*, *Magnaporthe grisea*, and *Ustilago maydis* and from well known genetic models such as *Aspergillus nidulans* and *Neurospora crassa*.

[PL PA 739 Advanced Mycology
Spring. 4 credits. Prerequisites: PL PA 309 or equivalent, and permission of instructor. Not offered 2001–2002. 1 lecture; 2 labs TBA. K. T. Hodge.
Advanced-level topics in mycology, including ecology and systematics of selected fungal groups. One lecture per week introduces the week's topics; students gain hands-on experience working with and identifying fungi during two laboratory sessions. The course is aimed at students pursuing or preparing for graduate-level work in mycology.]

PL PA 788 Research in Molecular Plant Pathology
Fall and spring. 2, 4, or 6 credits. Prerequisite: permission of instructor before beginning research. S-U grades only. S. V. Beer.
Guided research experiences in laboratories addressing questions concerning the interaction of pathogens (bacteria, fungi, viruses) and plants at the molecular level. Intended for beginning graduate students with a concentration in Molecular Plant Pathology and sufficient theoretical background and practical laboratory experience. Students submit plans and reports on each research experience.

PL PA 797 Special Topics
Fall or spring. 1–5 credits. S-U grades optional.
An opportunity for independent study of a special topic.

PL PA 798 Graduate Teaching Experience
Fall or spring. 1–5 credits. S-U grades. Hours TBA. Staff.
Graduate teaching assistance in a mycology or plant pathology course by mutual agreement with the instructor. This experience may include, but is not limited to, preparing, assisting in, and teaching laboratories, preparing and delivering lectures, leading discussion sessions, and tutoring.

PL PA 800 Master's-Level Thesis Research
Fall or spring. Credit TBA. S-U grades optional. Prerequisite: permission of adviser. Graduate faculty.
For students working on a master's degree.

PL PA 900 Graduate-Level Thesis Research
Fall or spring. Credit TBA. S-U grades optional. Prerequisite: permission of adviser. Graduate faculty.
For students in a Ph.D. program who have not passed the "A" exam.

PL PA 901 Doctoral-Level Thesis Research
Fall or spring. Credit TBA. S-U grades optional. Prerequisite: permission of adviser. Graduate faculty.
For doctoral candidates who have passed the "A" exam.

POMOLOGY (FRUIT SCIENCE)

See Horticulture.

RURAL SOCIOLOGY

P. D. McMichael, chair; D. L. Brown, P. R. Eberts, P. Eloundou-Enyegue, S. Feldman, J. D. Francis, C. C. Geisler, P. K. Gellert, A. Gonzales, D. T. Gurak, T. A. Hirschl, T. A. Lyson, M. J. Pfeffer, J. M. Stycos, L. B. Williams

Note: class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

R SOC 100 Introduction to American Indian Studies (also AIS 100)
Fall. 3 credits. S-U optional. Enrollment limited to 550. W 7:30–10:30 P.M. R. W. Venables.
Slide lectures survey the rich cultures and complex histories of the Indian nations north of Mexico. Indian arts and philosophies are compared and contrasted with those of Europe, Africa, Asia, Canada, and the United States. The origins of today's major legal issues involving American Indians are also discussed. The course begins with a survey of Indian America before Columbus and ends at Wounded Knee in 1890, the event which marks the end of the conquest of Indian America. Guest lecturers, including American Indian leaders, provide additional perspectives.

R SOC 101 Introduction to Sociology
Fall, spring, or summer. 3 credits. Enrollment limited to 300 in the fall, 400 in the spring. Lecs, T R 10:10–11:00; sec, various times. Fall, T. Hirschl; spring, staff.
This course provides an introduction to theory and research in sociology. It demonstrates how the insights, theories, and methods of sociological analysis can be brought to bear on major issues of social life. A primary goal is to convey a sense of the manner in which sociologists formulate theories and how the collection and analysis of data are used to evaluate those theories. The course provides "hands-on" experience in analyzing sociological issues. Students undertake guided research exercises that involve using computers to analyze actual data. No prior background is presumed; necessary skills are covered in class and section meetings.

[R SOC 103 Self and Society (also SOC 103)
Fall. 3 credits. S-U optional. Not offered 2001—2002. Lec, T R 1:25–2:15. M. Macy.
An introduction to microsociology, focusing on social processes in small groups, including the family. Emphasis is on leadership, conformity, social influence, cooperation and competition, distributive justice, and micro analyses of interaction.]

R SOC 105 Economic Sociology (also SOC 105)
Fall. 3 credits. S-U optional. M W 1:25–2:15. Sec 1 F 12:20–1:10; sec 2 F 1:25–2:15. C. Leuenberger.
This course examines how sociologists understand the economy as a social phenomena. The focus is on classical and contemporary theorists as well as empirical studies in economic sociology. Students consider the impact of the dynamics of capitalism and globalization on social life and how the economic organization of society can be related to religion, culture, and concepts of leisure. Also investigated are areas in which people interact with the economy on a daily basis: in selling, shopping, and consuming.

R SOC 175 Indian America in the Twentieth Century (also AIS 175)
Spring. S-U option. Enrollment limited to 125. Lec, M W 11:15–12:05; sec, various times. B. Baker.
This course addresses major U.S. policies affecting American Indians in the twentieth century, and ways in which American Indians pursued strategies to sway the process of social change. American Indian political, economic, and cultural issues are examined through history, literature, music/art, and film/documentary. The approach of this course is interdisciplinary and an emphasis is placed on the study of American Indians as living cultures. Current trends are discussed, and the implications for American Indians in the twenty-first century are explored. Guest lecturers, including American Indian scholars, leaders, and activists, provide additional perspectives.

[R SOC 200 Social Problems (also SOC 200)
Fall. 3 credits. S-U grades optional. Enrollment limited to 100. T R 10:10–11:25. Not offered fall 2001. T. A. Hirschl.
This course investigates a variety of current social problems from a sociological perspective. The course begins with an overview of sociological theories that may account for social problems and identifies common as well as competing elements of these theories. The theoretical framework is then applied to analyze a variety of social problems, which may vary semester to semester. Examples of social problems are homelessness, teenage pregnancy, deindustrialization, and homicide, among others. Emphasis is given to how social problems are measured, and students are given an opportunity to test theories with data analysis.]

R SOC 201 Population Dynamics (also SOC 202)
Spring. 3 credits. S-U grades optional. Enrollment limited to 35. ALS students must register for this course as R SOC 201. T R 2:55–4:10. P. Eloundou-Enyegue.
This course provides an introduction to population studies. After reviewing basic concepts and demographic principles and techniques, the course focuses on how demographic processes (fertility, mortality, and migration) affect social and economic outcomes. Discussions cover special topics related to population growth and distribution, including mass education, marriage and family formation, labor force participation, inequality and poverty, women's status, resource allocation, and the environment.

R SOC 205 International Development (also SOC 206)
Spring. 3 credits. Enrollment limited to 74. M W F 10:10–11:00. Staff.
New questions concerning development models in the post-Cold War era are examined from a comparative and global perspective on North-South relations. While the focus is the "Third World," the issues confronting it are often global, even when they concern the most basic issue of food security. Using films and various theoretical perspectives, we examine Southern societies (economies, ecologies, class/gender relations) and the impact of global forces on Southern resources. Such forces include global food systems, new forms of export production, development agencies, multilateral institutions, local bureaucracies, transnational corporations, the debt crisis, and new technologies. Also examined, are the new social movements, such as environmentalism, feminism, and grassroots activism.

R SOC 206 Gender and Society (also WOMNS 206)
Spring. 3 credits. Enrollment limited to 100. Lecs, M W 11:15–12:05; sec, various times. B. Wejnert.
Course familiarizes students with origin of gender hierarchies, social and behavioral similarities/differences between females and males, and the degree that biological, psychoanalytic, psychological and sociological perspectives help to understand the differences. United States and cross-cultural comparisons of the consequences of gender inequality are a major focus of the course. Objectives are met through lectures, readings, films, participant observation, and personal experiences.

R SOC 207 Problems of Contemporary Society (also SOC 207)
Fall. 3 credits. S-U grades optional. Lec, M W F 1:15–2:15. D. Heckathorn.
This course examines contemporary social problems, with a focus on their sources in the organization of society. Modern societies are based on three fundamental types of institutions—social norms, hierarchies, and markets. Each is subject to distinctive types of failures resulting in problems that include poverty, prejudice and discrimination, intolerance and hate, alcohol and drug abuse, physical and mental illness, crime and delinquency, and urban problems. In analyzing these problems, the institutions through which they are created and perpetuated, and the forms of institutional change required to address them are emphasized.

R SOC 208 Technology and Society
Fall. 3 credits. Offered odd years. M W F 10:10–11:00. C. C. Geisler.
The relationship between technology and society is among the most pervasive concerns of our time. Ultimately, what makes a technology useful or "appropriate" is a sociological question. Lectures and readings review classical debates regarding technology and society. Herein, students compare high technologies and appropriate technologies, identify problems associated with technology transfer to other societies, and create a list of important criteria by which technologies are judged appropriate or inappropriate using numerous case studies.

R SOC 209 Social Inequality (also SOC 208)
Spring. 3 credits. S-U optional. T R 1:25–2:40. D. Grusky.
This course examines the nature and processes of social inequality in industrial societies. The principal focus is on the contemporary United States, with some comparisons to other industrial societies with different educational and class structures. Readings include theoretical and empirical materials on urban inequality and stratification along race, class, and gender lines. The course includes ethnographies of schools and workplaces as well as more quantitative research.

R SOC 213 Social Indicators, Data Management, and Analysis
Fall. 3 credits. Offered alternate years (complement of R SOC 214). T R 11:40–12:55. P. R. Eberts.
A survey of definitions of social indicators and general principles of social indicators research is illustrated from data on both developed and less-developed countries. Data management and analysis of measures of poverty, level of living, inequality, quality of life, and so on, based on census data, household surveys, and key-informant and other low-cost techniques, are examined using personal computers.

[R SOC 214 Research Methods for the Social Sciences
Fall. Offered even years (complement of R SOC 213). 3 credits. Enrollment limited to 25. T R 11:40–12:55. Not offered 2001–2002. L. B. Williams.
A number of approaches to conducting research in the social sciences will be presented. These include observation techniques, unstructured, semi-structured, and structured interviews, experiments, and focus groups. Some statistical techniques for data analysis are discussed. A background in elementary statistics is preferred although it is not required.]

R SOC 215 Organizations: An Introduction (also SOC 215)
Spring. 3 credits. S-U optional. Lec, T R 10:10–11:25. S. Han.
This is an introductory course in the study of organizations. Students start by taking a look at various examples of organizing, including: a street gang in a Boston neighborhood, a minority community, industrial corporations, modern universities, Silicon Valley and Route 128, and more. Hence, a sampler. These brief glimpses serve as exercises in looking behind and beyond diverse rhetoric for common patterns in organizational phenomena. The focus of the course is on research scholarship, not the training of managers. Nonetheless, the analytical skills students acquire are applicable to work in firms, government agencies, and nonprofit organizations.

R SOC 220 Sociology of Health of Latinos and Ethnic Minorities (also LSP 220)
Fall. 3 credits. S-U grades optional. Enrollment is limited to 15. T R 10:10–11:25. P. A. Parra.
Discusses the health status of minorities in the United States. This course explores intragroup diversity such as migration, economic status, and the influence of culture and the environment on health status and access to health care. Although special attention is given to Latino populations, discussion encompasses other minorities who face similar problems.

R SOC 261 Sociology of Sustainable Development
Fall. 3 credits. S-U grades optional. M W 2:55–4:10. L. Glenna.
This course is designed to offer a critical evaluation of sustainable development as concept and practice. Although scholars and practitioners now analyze and debate it, sustainable development originated more in practice than in theory. Powerful global organizations, governments, and local activists have adapted and adopted it since it was popularized in the 1987 Brundtland report, giving rise to more than 40 definitions by 1994. To determine the social usefulness of such a widely debated term, students examine its evolution from the original eighteenth-century concept of development into sustainable development in the field of natural resource management in the 1970s and into an environmental critique of economic growth, or market society, in the 1980s. Then students debate the salience of this concept by evaluating case studies in the United States and other parts of the world.

R SOC 301 Theories of Society (also SOC 375)
Spring. 3 credits. Prerequisites: Rural sociology or sociology course. S-U grades optional. Enrollment is limited to 30. M W F 11:15–12:05. P. K. Gellert.
An introduction to the "classical" sociological theorists (Marx, Weber, Durkheim) of the late nineteenth and early twentieth century, as well as "erased" and missing sociological voices of the period (such as C. Perkins Gilman, W.E.B. DuBois). The course addresses the dramatic social upheavals including the fall of the 'old order,' industrialization, capitalism, and rise of bureaucracy to which these thinkers reacted and the inspiring (and conflicting) visions for the future which they offered. The intellectual history, the influence of the theorists on subsequent sociology, and the potential for relevance to contemporary society are emphasized.

R SOC 302 Evaluating Statistical Evidence (also SOC 301)
Fall. 3 credits. S-U optional. Lec, M W 10:10–11:00. Staff.
A first course in statistical evidence in the social sciences, with emphasis on statistical inference and multiple regression models. Theory is supplemented with numerous applications.

R SOC 305 Education, Inequality and Development
Spring. 3 credits. Letter grade. Prerequisite: introductory social science course or permission of instructor. T R 1:25–2:40. P. Eloundou-Enyegue.

Improvements in formal school systems are often advocated as solutions for a variety of economic, health, political, and environmental problems in non-industrial nations. Commonly suggested improvements include: raising enrollments, reducing schooling inequalities, improving the quality and relevance of instruction, and adjusting the private returns to schooling. This course offers a critical assessment of human capital approaches to development. The course examines how improvements in mass schooling can be achieved in poor countries and how much such improvements are likely to boost these countries' economic prospects. Specific reviews focus on: current trends in mass schooling across the developing world; patterns of schooling inequalities; policy tools for evaluating the impact of alternative education policies; and the theory and evidence on the benefits of mass schooling on development indicators.

R SOC 311 Social Movements
Spring. 3 credits. T R 11:40–12:55. A. Gonzales.
Social movements are collective efforts by relatively powerless groups of people to change society. Social movements have occurred throughout history and the world, even under the most repressive regimes. This course examines the origins and impact of contemporary social movements on politics and policy in the United States and elsewhere. After reviewing the major theoretical perspectives on social movements, focus is on three questions: Under what circumstances do movements emerge? How do movements internally organize and choose political tactics and strategies to achieve their goals? How have these movements changed history, identities, society, and politics? The course explores these questions through an examination of Indigenous movements for social justice, civil rights, environmental protection, and trial sovereignty.

R SOC 318 Ethnohistory of the Northern Iroquois (also AIS 318)
Spring. 3 credits. S-U grades optional. Enrollment limited to 20. T 1:25–4:25 R. W. Venables.
The development of Iroquois (Houdenosaunee) history and culture is traced to the present day.

R SOC 324 Environment and Society (also S&TS 324 and SOC 324)
Spring or summer. 3 credits. Enrollment limited to 100. M W F 1:25–2:15. L. Glenna.
The main objective of the course is to develop a critical understanding of the dominant trends in modern U.S. environmental thought like preservationism, conservationism, deep ecology, ecofeminism, social ecology, NIMBYism, risk assessment, and environmental equity. Another objective is to familiarize students with some major contemporary substantive environmental problems and policies. These topics include air and water quality, public lands management, biodiversity, deforestation, climate change, and ozone depletion. A sociological framework is applied to evaluate interrelationships of substantive and philosophical/theoretical issues.

R SOC 325 Indigenous People and Globalization
Fall. 3 credits. Prerequisites: introductory social science course or permission of instructor. Letter grade. T R 2:55–4:10. A. Gonzales.
This course examines issues of globalization and how they affect indigenous people in the Americas. The processes of globalization, under the auspices of the World Trade Organization and regional economic agreements such as the North American Free Trade Agreement (NAFTA), have profound social, cultural and economic impacts upon indigenous peoples. At issue are the lands, resources, traditional knowledge, cultural property, and tribal sovereignty of indigenous peoples. This course examines issues such as the effect of NAFTA on the Indian people of Mexico and Central America; issues of cultural 'property' such as songs and stories of native artists; intellectual property such as plant medicines; the question of treaties and water rights; and whether and to what extent civil society can truly include and address the interests of indigenous peoples.

R SOC 331 Demographic Analysis in Business and Government (also AEM [ARME] 416)
Fall. 3 credits. Prerequisite: AEM (ARME) 210 or equivalent. Enrollment limited to 50 students (15 R SOC students, 35 AEM (ARME) students). Lec, M W F 1:25–2:15. W. Brown.
An overview of the way demographic analysis is used in business and government. Through the use of case study and problem solving methods of learning, students come to understand how demographic concepts, methods, and data are used by demographers to solve problems in business and government. The course is designed for upper-level undergraduates from a variety of academic disciplines and career orientations. Students work on problems drawn from consumer marketing, education, housing and real estate development, human resources, and health services.

R SOC 333 Genomics and Society
Fall. 3 credits. T R 1:25–2:40. L. Glenna.
The implications of genomics for society are far-reaching and controversial. In this course, a sociological perspective is deployed to examine and situate the debate by examing proponents' and opponents' assumptions about science and society. Special attention is given to the social origins and goals of agricultural and food biotechnologies, questions of social and environmental risk and reward, its relationship to previous trends in agricultural and food technologies, and the social forces and conditions that put biotechnology on the research and commercial agenda at this time. Placing the debate in social context promotes understanding and constructive dialogue regarding an important social issue.

R SOC 336 Rural Areas In Metropolitan Society
Spring. 3 credits. S-U grades optional. Prerequisite: a social science course. T R 11:40–12:55. Offered alternate years. D. L. Brown.
This course analyzes the changing structure and role of small towns and rural areas in developed nations. The focus is on adaptation of rural communities and populations to major trends including increased societal differentiation and complexity, increased societal interdependence, and rapid social, economic, technological, and ecological change. Alternative policies to ameliorate rural problems and/or enhance rural contributions to national development are considered. Students participate in group research projects in rural communities.

R SOC 340 Sociology of Food Systems
Spring. Enrollment limited to 25 students. 3 credits. S-U grades optional. T R 1:25–2:40. G. W. Gillespie.
Our changing food and agricultural systems are examined sociologically, with attention to how these reflect the social organization of an increasingly global society. What are the major trends? What drives them? What do these trends imply for people, communities, and the environment? What are the social, human health, and environmental issues? What might be better alternatives and what strategies of development might achieve them? This course addresses such questions.

[R SOC 360 Sociology of American Indians (also AIS 361)
Spring. 3 credits. S-U option. Enrollment limited to 20. Prerequisite: RSOC/SOC 101, AIS 100 or AIS 175, or approval of the instructor. Enrollment limited to 20. W 2:30–4:25. Not offered spring 2002.
This course is designed to emphasize the role of theory and research in our understanding of American Indians. Towards that end, the relationship between the nation-state and indigenous populations is emphasized. Students are exposed to the following theoretical perspectives: world systems and dependency, internal colonialism, social disintegration, the social construction of reality, political mobilization, and ethnic reorganization. The course is also historical and comparative, as students study different Indian tribes located in the United States and Canada.]

R SOC 367 American Indian Politics and Policy (also AIS 367)
Fall. 3 credits. S-U option. Enrollment limited to 20. T R 2:55–4:10. B. Baker.
This course addresses the Constitutional basis of the Federal-Indian relationship through an examination of treaties, Supreme Court decisions, and congressional law/policy. The effects of European and American forms of governance on traditional American Indian political structures are detailed and contrasted with contemporary tribal governments and political organizations. Issues relating to sovereignty and self-governance with respect to American Indian tribal governments are addressed relative to state and federal governments.

R SOC 370 Comparative Issues in Social Stratification (also SOC 371)
Fall. 3 credits. Prerequisite: an introductory social science course. T R 1:25–2:40 or T R 8:40–9:55 (depending on professor). T. A. Lyson or S. Feldman.
This course reviews both classical and contemporary issues in the comparative social stratification literature. Particular attention is given to the changing configurations of different labor markets, debates on the meaning of new economic constituencies, and the role of gender, race, ethnicity, and sexuality in assessing the patterns, meaning, and experiences of inequality. Throughout the course special attention is given to the

importance of understanding how questions of measurement are constructed and employed in understanding social inequality.

R SOC 380 Independent Honors Research in Social Science
Fall and spring. 1–6 credits. Limited to students who have met the requirements for the honors program. A maximum of 6 credits may be earned in the honors program. Staff.
Students should select a faculty adviser and begin proposal development during the junior year. Students must submit written proposals by the third week of the semester of their senior year to the departmental honors committee representative.

[R SOC 418 Population Policy (also B&SOC 414)
Spring. 3 credits. Prerequisite: R SOC 201 or permission of instructor. Enrollment limited to 15. T R 10:10–11:25. Offered alternate years. Not offered 2002. Staff.
The ways in which societies try to affect demographic trends. Special focus is on government policies and programs to reduce fertility.]

R SOC 430/629 Migration and Population Redistribution
Spring. 3 credits. Prerequisite: a social science course or permission of instructor. T R 8:40–9:55. Offered alternate years. D. L. Brown.
This course analyzes the determinants and consequences of internal migration in urban and rural areas of developed and developing nations. Economic and demographic interrelationships are emphasized as are implications of changes in local and regional population size and composition for labor supply, the demand for goods and services, and infrastructure. Public policy implications of the inter-relations are investigated. Techniques and measurement issues associated with the analysis of migration and population distribution are discussed. For 629, graduate students also meet with the instructor every other week to discuss graduate readings and topics relevant to their papers.

[R SOC 431/631 Comparative Ethnic Stratification: Demographic Perspectives
Spring. 3 credits. S-U grades optional. Prerequisite: Intro to Sociology or permission of instructor. T R 11:40–12:55. Not offered 2002. D. Gurak.
A comparative examination of ethnic stratification and mobility that focuses principally on dimensions of social groups that can be empirically measured using readily available demographic sources. These include residential segregation, occupational status and mobility, marriage and family formation patterns, health and mortality, family structure, fertility, and intermarriage. The role of migration in shaping ethnic stratification systems is also examined. About half of the course examines the U.S. situation. Other societies receiving significant attention include India, Brazil, Nigeria, and several European societies. For 631, graduate students will also meet with the instructor every other week to discuss graduate readings and topics relevant to their papers.]

[R SOC 437 Aging and Aging Social Policy in the 1990s
Fall. 3 credits. Prerequisite: R SOC 101 or its equivalent. Enrollment limited to 30. T R 11:40–12:55. Not offered 2001–2002. Staff.
An analysis of the "graying" of America and the responses of the public and private sectors to this demographic revolution. Examines the interplay between basic and applied knowledge in social gerontology. Explores the formal and informal networks of services, in both rural and urban environments, that help maintain independent living arrangements for the elderly.]

R SOC 438/638 Population and Development
Fall. 3 credits. S-U grades optional. Prerequisite: permission of instructor. T R 11:40–12:55. D. Gurak.
Examines major historical and recent demographic transitions in mortality, fertility, age structure, and composition and explore the relationships between these transitions and the social, or economic, and cultural changes being experienced by diverse societies prior to, during, and following the onset and conclusions of the demographic shifts. Case studies from diverse historical periods and geographic locations are used. Graduate students also meet with the instructor every other week to discuss graduate readings and topics relevant to their papers.

[R SOC 440 The Social Impact of Resource Development (also AIS 440)
Spring. 3 credits. S-U grades optional. Offered alternate years. Not offered 2001–2002. C. C. Geisler.
Social impact assessment (SIA) is a method of anticipating unwanted side-effects of projects, policies, and new technologies before they happen and a decision tool for mitigation. The seminar explores SIA applications in different parts of the world and pays particular attention to impacts on native and indigenous peoples. Students learn practical SIA skills and related theoretical/conceptual debates.]

R SOC 442 American Indian Philosophies: Selected Topics (also AIS 442)
Spring. 3 credits. S-U grades optional. Prerequisite: permission of instructor. Enrollment limited to 15. R 1:25–4:25. R. W. Venables.
This course provides an opportunity for students to read and discuss a wide range of American Indian philosophies.

R SOC 494 Special Topics in Rural Sociology
Fall or spring. 4 credits maximum. S-U grades optional.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

R SOC 495/695 Population and Development in Sub-Saharan Africa
Fall. 3 credits. S-U grades optional. Prerequisite: permission of instructor. T R 2:55–4:10. P. Eloundou-Enyegue.
This course examines recent trends in population, the economy and environment in sub-Saharan Africa. After reviewing these individual trends, the course examines possible linkages among these three processes. Specific discussions examine the theory and evidence on the effects of rapid population growth on the economy, mass schooling, health, gender and community structures, sustainable agriculture, and inequality. Graduate students are assigned additional reading and writing and meet bi-weekly in a seminar format.

R SOC 497 Independent Study in Rural Sociology
Fall or spring. 3 credits variable (may be repeated for credit). Students must register with an Independent Study form (available at 140 Roberts Hall). S-U grades optional.
Informal study may include a reading course, research experience, or public service experience.

R SOC 560 Managing Local Environmental Systems: Social Perspectives and Research Bases
Fall. 3 credits. S-U optional. Enrollment limited to 15. W 1:25–4:25. Staff.
Course is for students with diverse backgrounds: undergrads, grads, people in professional careers, others with interest in environmental issue identification, resolution, and management. Course discussions include ecological, social, economic, and local government perspectives. Via lab exercises throughout the semester, students have opportunities to apply the concepts and principles of these perspectives to analysis of specific local environmental management problems. Readings, lectures, and a course project are mandatory.

R SOC 599 M.P.S. Project
Fall and spring. 1–6 credits. S-U optional. Lec: TBA. Graduate faculty.
For students admitted specifically to a MPS program.

R SOC 601 Theoretical and Methodological Approaches to Community and Rural Development
Fall. 3 credits. Letter grade only. Prerequisite: graduate student. Lec, W 7:30–10:00 P.M. P. R. Eberts.
A survey of three general approaches for conducting analysis and practice in community and rural development. These approaches include examinations of: (1) community structural changes and policymaking; (2) participatory processes for generating community development; and (3) planning strategies as mechanisms for creating community development opportunities.

R SOC 602 Community Development Seminar
Spring. 1 credit. Prerequisite: R SOC 601. W 7:30–10 P.M. (Meets tri-weekly.) P. R. Eberts.
A participatory seminar for feedback, collective learning, and guidance as M.P.S. students apply community and rural development theory and methods in thesis project work with local and regional communities.

R SOC 603 Classical Sociological Theory
Fall. 4 credits. S-U grades optional. Prerequisites: open to graduate students only. T R 2:55–4:10. M. J. Pfeffer.
Students review the main streams of classical sociological thought, focusing on the work of Weber, Durkheim, Marx, and Simmel. Course materials include original texts and secondary literature, used to examine the concepts,

methods, and explanation in classical sociological thought. Important objectives of the course are to identify the philosophical and conceptual core of the discipline and to critically evaluate the relevance of the classical theories to contemporary social change and development.

R SOC 606 Sociological Theories of Development
Spring. 3 credits. T 2:30–5:30. P. K. Gellert.
This course is a critical examination of a historical range of theories and research in the sociology of development from the post-war period through the present. Major topics include modernization theory, dependency theory, world-system theory, the developmental state, global commodity chains, and globalization. Throughout the course, the concept of development itself is questioned and critiqued both theoretically and in terms of practical challenges from environmental, indigenous and other social movements.

[R SOC 607 Sociology of Natural Resources and Development
Fall. 3 credits. S-U optional. Not offered 2001–2002. R 1:25–4:25. P. K. Gellert.
Building on theories in the sociology of development, this seminar examines the role of natural resource extraction, processing, and exports to global markets in the developmental trajectories of nations in Asia, Africa, and Latin America. Engages students in both theoretical debates and practical implications of resource access, control, and conflict amongst various social actors ('stakeholders'). Detailed historical cases are examined, primarily from Southeast Asia (Indonesia, Malaysia, Philippines).]

R SOC 608 Demographic Techniques (also PAM 606)
Fall. 3 credits. Prerequisite: multivariate statistics or permission of instructor. S-U grades optional. T R 2:55–4:10. D. Gurak.
This course provides an introduction to the methods, measures, and data used in the analysis of human populations. Topics include demographic rates, life-table analysis, cohort vs. period analysis, sources and quality of demographic data, population estimation and projection, and stable population models.

R SOC 612 Population and Development in Asia (also WMNS 612)
Spring. 3 credits. Offered odd years. W 10:10–1:10. L. B. Williams.
This graduate seminar considers issues surrounding population and development in Asia. Case studies pertaining to Southeast Asia are highlighted. The linkages between population and development are highlighted and both are considered from a historical perspective. Recent social, economic, and demographic changes in the region are considered in depth. Evolving gender roles in the family, labor force, and broader social context are also examined.

[R SOC 618 Research Design I
Fall. 4 credits. Prerequisite: a statistics course. T R 12:20–2:15. Not offered fall 2001. J. D. Francis.
First of a two-semester sequence (may be taken individually) in introductory graduate methods. Discusses problems of measurement, the design of instruments, and problems of reliability and validity. Common forms of measuring instruments are discussed. Concludes with an introduction to factor analysis. Students apply principles to development of several common types of scales. Computers are used extensively.]

[R SOC 619 Research Design II
Spring. 4 credits. Prerequisite: an introductory methods course and a statistics course. T R 12:20–2:15. Not offered spring 2002. J. D. Francis.
The second part of the two-semester sequence in introductory graduate methods, with emphasis on an intermediate-level treatment of the following topics: regression, analysis of variance, analysis of covariance. Special attention is given to use of categorical variables in regression. Students develop and examine several analytical models using actual data to familiarize themselves with data handling and processing. Includes extensive use of computers.]

R SOC 620 Sociology of the Community
Fall. 3 credits. R 1:25–4:25. D. Brown.
This graduate seminar critically analyzes the intellectual core of community sociology, and its theoretical development over time. "Community," as a concept, is often reified and rarely critically examined, hence the course begins by clarifying the various ways in which "community" has been conceptualized and operationalized by sociologists. The course provides students with both a grounded conceptual foundation and an overview of multiple strategies for conducting research on community structure and change in the United States and internationally. The course includes a critical examination of the forms and shapes sociological research on the community assumes. A case study approach is used to examine the assumptions driving the methods and analysis of both contemporary and historical research.

[R SOC 621 Foundations of Environmental Sociology
Fall. 3 credits. Open to graduate students only. S-U optional. Enrollment limited to 20. W 10:10–12:35. Offered even years. Not offered 2001–2002. L. Glenna.
Foundations of Environmental Sociology provides graduate students with a broad survey of the literature in this disciplinary specialty area. Students review the history of thought in environmental sociology as well as key literature in the various substantive foci of this specialty. The principle objective of this course is to provide graduate students specializing in environmental sociology with a firm grasp of the content, controversies, and trends in the area. Sessions are conducted in a seminar style, and discussions are focused on close review of assigned readings.]

R SOC 625 State, Economy, and Society
Spring. 3 credits. Enrollment limited to 25. W 1:25–4:25. Offered even years. P. D. McMichael.
Reviews major issues concerning the relations between political and economic institutions and the role of states, markets, firms, social movements, and cultural institutions in the process of social change. Theoretical perspectives are drawn from classical and modern social theory, including the application of comparative and world/historical methodologies.

R SOC 630 Field Research Methods and Strategies
Fall. 3 credits. Enrollment limited to 20. W 10:10–1:10. Offered odd years. L. B. Williams.
This course covers a variety of methods: focus groups, in-depth interviews, participant observation, archival research, and structured surveys, among others. The importance of matching research questions with appropriate field methodologies and the strengths and weaknesses of various strategies of field research are assessed. Practical experience with a number of methodologies is offered. Ethical issues involved in fieldwork are highlighted.

[R SOC 640 Community and Changing Property Institutions
Fall. 3 credits. R 1:25–4:25. Offered even years. Not offered 2001–2002. C. C. Geisler.
The seminar acquaints students with the evolution of property rights, from antiquity to the present, and features a number of property debates (the biological basis of ownership; private versus public ownership; property and value; the so-called "tragedy of the commons"; the "new" property). Readings explore land use regulation and property rights, common property issues, opposing land ethics, and new property forms in the future.]

[R SOC 641 Politics and Economics of Rural and Regional Development
Fall. 3 credits. Limited to upperclass or graduate students. S-U grades optional. M 12:20–2:50. Offered alternate years. Not offered 2001–2002. T. A. Lyson.
A survey of social, political, and economic factors in local and regional development. Theories of community and regional development and underdevelopment are explored. Neoclassical, Marxist, and civil society theories are examined within local and global contexts.]

[R SOC 643 Land Reform Old and New
Spring. 3 credits. S-U grades optional. R 1:25–4:25. Not offered spring 2002; next offered spring 2003. C. C. Geisler.
Land reform continues to be a major cornerstone of development planning. Currently the number of landless and near-landless in the Third World will approach one billion. Though land reform is a principal source of hope for the landless, its meanings are many and its models are controversial. The seminar acquaints students with land reform in antiquity as well as in contemporary settings (among others, Japan, the Philippines, Israel, India, Brazil, Mexico, Russia, and the United States). Perennial issues of equity, efficiency, and sustainability are discussed in each of these case study areas.]

[R SOC 645 Rural Economy and Society
Spring. 3 credits. W 1:25–4:25. Offered alternate years. Not offered 2001–2002. Staff.
The structure and dynamics of rural communities are examined in a comparative historical framework focusing on continuities and divergences among imperialist and post colonial settings. Major topics include classical theories of rural social organization and their retheorization in contemporary peasant studies and agrarian political economy literatures, theorizations of locality, rurality and spatial complexity within the world economy, and critical issues framing the

relationship between political and labor market restructuring and petty commodity and household production systems.]

[R SOC 655 Advanced Techniques of Demographic Analysis
Spring. 3 credits. Prerequisites: CEH 606, graduate standing or permission of instructor. Enrollment limited to 25. M 7:30–10:30 P.M. Offered alternate years. Not offered 2001–2002. D. T. Gurak.
An examination of analytical techniques that assumes a basic knowledge of demographic data and research methodology. Life tables, demographic estimates with incomplete data, survey techniques to supplement inadequate vital registration systems, data management, multi-level models, and other multivariate procedures are among the topics covered.]

[R SOC 661 Sustainable Agriculture and Development
Spring. 3 credits. S-U grades optional. Prerequisites: graduate standing or instructor's permission. Offered alternate years. M 10:10–12:35. Not offered 2001–2002. T. A. Lyson.
This course examines the relationship between local agriculture and development as these are embedded in a globalizing economy. Topics include an examination of the social scientific theoretical underpinnings of conventional agriculture, the social origins of sustainable agriculture, environmental and community sustainability, agricultural diversification strategies, community agriculture development, and the political and policy contexts of more sustainable agricultural systems.]

R SOC 666 Genomics, Agriculture, Food Systems and Development
Spring. W 10:10–1:10. T. A. Lyson.
This seminar examines many of the emerging social, economic, political, cultural and demographic aspects of agricultural and food related genomics. Advanced biotechnologies have the potential to revolutionize many aspects of society—from how, where, when, and by whom food is produced, processed and consumed, to how dietary changes may be used to treat illness and disease. The consequences of the genomics revolution ' development processes in both advanced industrial as well as the developing world are considered.

R SOC 671 Epistemological Challenges to Social Science Paradigms: A Feminist Inquiry (also WOMNS 671)
Fall. 3 credits. W 1:25–4:25. Offered alternate years. S. Feldman.
This course reviews and analyze contemporary themes in feminist epistemological critiques of sociological methods and knowledge systems. It identifies mainstream explanations within the social sciences, introduces early feminist challenges to androcentric paradigms, and explores philosophical assumptions of postmodern and poststructural analyses. Substantive foci assess various approaches to field, archival, and survey research, and the theoretical presuppositions of approaches from rationalism to postpositivism. Also addressed are the linkages between theory and questions of political practice, individualism, and autonomy.

[R SOC 675 Global Patterns of International Migration
Fall. 3 credits. Enrollment limited to 20. M 7:30–10:30 P.M. Offered alternate years. Not offered 2001–2002. Staff.
International migration to the United States and other countries has increased in recent decades. What accounts for that trend in an era when large-scale international migration is supposed to have ended and what are the implications of immigration for receiving countries? Theories and research on these issues are examined in the course from a comparative and interdisciplinary perspective. Several migration systems are examined, including those of North America and the European Community. Policies shaping immigration are also reviewed.]

R SOC 694 Special Topics in Rural Sociology
Fall or spring. 4 credits maximum. S-U grades optional.
The department teaches "trial" courses under this number. Offerings vary by semester, and are advertised by the department before the semester starts. Courses offered under the number will be approved by the department curriculum committee, and the same course is not offered more than twice under this number.

[R SOC 715 Comparative Research Methods
Spring. 3 credits. M 12:20–2:50. Offered odd years. Not offered 2001–2002. T. A. Lyson.
This seminar focuses on the comparative method in the social sciences. The logic of comparative inquiry forms the substantive base of the course. Topics include cross-national and cross-regional research design and an analysis of the comparative case study approach. Illustrations of the comparative research approach cover a range of data types and problems.]

R SOC 718 Multidimensional Measurement and Classification
Fall. 4 credits. Prerequisite: previous course work in scaling and statistics. T R 12:20–2:15. Offered odd years. J. D. Francis.
An advanced course in measurement and scaling, building from work by Thurstone, Guttman, and Coombs to multidimensional measurements. Topics include philosophy of factor analysis, factor-analysis models, factoring design, factoring techniques, and comparison with factor-analysis models. Cluster analysis and multidimensional scaling are the other major techniques discussed. As matrix algebra is an integral part of these procedures, class time is devoted to this topic. Computers are used to analyze fit to models.

R SOC 719 Logistic and Log Linear Models
Spring. 4 credits. Prerequisites: two courses in statistics and one in methods. T R 12:20–2:15. Offered even years. J. D. Francis.
The first part of the course reviews multiple regression theory and procedures, after which extensions of these models to categorical data are discussed. Consideration is given to violations of assumptions and their effects. Then more advanced regression concepts and estimation techniques are discussed. The main focus of the course is on logit and log linear models. Computerized labs are an integral part of the course.

R SOC 725 The Sociology of "Third World" States
Fall. 3 credits. W 1:25–4:25. Offered alternate years. S. Feldman.
This course examines how processes of political and economic restructuring have reshaped state capacities and processes of state formation. Particular attention is paid to questions of class formation, corporatist alliances, transnational interests, and alternative development strategies with the emergence of austerity, privatization, and trade liberalization and its neoliberalist ideology. Critical to this discussion are the contours of authoritarianism, nationalism, communalism, and fundamentalism as these reconfigure national and regional alliances and practices and shape interpretations of current processes of resistance, change, and terms of intervention and exchange.

[R SOC 730 Sociology of Global Change
Spring. 3 credits. S-U grades optional. Enrollment limited to 20. W 1:25–4:25. Offered odd years. Not offered 2001–2002. P. D. McMichael.
Analyses of social change and development are increasingly sensitive to global context. They include the sociology of the world economy as a multi-layered entity anchored in an evolving international division of labor and the system of nation states, and the sociology of transnational political, economic, and cultural processes (e.g., food regimes, commodity chains, diasporas and transnational identities, the new regionalism, and transnational social movements). The seminar examines the substantive and methodological questions generated by research on these global processes, including questions of relevant units of analysis, situating global process in local events and subjectivities and vice versa, and examining the ways in which national structures and cultures interact with global structures and cultures.]

R SOC 791 Teaching Experience
Fall or spring. 1–3 credits. Limited to graduate students. S-U grades only. Graduate faculty.
Participation in the ongoing teaching program of the department.

R SOC 800 Master's-Level Thesis Research
Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty.
For students admitted specifically to a Master's program.

R SOC 872 Development Sociology
Limited to master's and doctoral degree candidates with permission of the graduate field member concerned. S-U grades optional. Graduate faculty.

R SOC 900 Graduate-Level Thesis Research
Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty.
For students in a Ph.D. program **only before** the "A" exam has been passed.

R SOC 901 Doctoral-Level Thesis Research
Fall or spring. Credit TBA. Prerequisite: permission of instructor. S-U grades optional. Graduate faculty.
For students admitted to candidacy **after** the "A" exam has been passed.

Related Courses in Other Departments

(Others may be added)

Population Dynamics (SOC 205)

Gender Relations, Gender Ideologies, and Social Change (WMNS 524)

Summer Session Courses

Introduction to Sociology (6-week session)

Environment and Society (3-week session)

Sociology of Health and Human Behavior (3-week session)

Soil, Crop, and Atmospheric Sciences (SCAS) courses are located in the Departments of Crop and Soil Sciences (CSS) and Earth and Atmospheric Sciences (EAS) section of this catalog.

VEGETABLE CROPS

See Horticulture.

FACULTY ROSTER

Abawi, George S., Ph.D., Cornell U. Prof., Plant Pathology (Geneva)
Acree, Terry E., Ph.D., Cornell U. Prof., Food Science, and Technology (Geneva)
Adleman, Marvin I., M. L. A., Harvard U. Prof., Landscape Architecture
Agnello, Arthur M., Ph.D., North Carolina State U. Assoc. Prof., Entomology (Geneva)
Ahner, Beth A., Ph.D., Massachusetts Institute of Technology. Asst. Prof., Agricultural and Biological Engineering
Albright, Louis D., Ph.D., Cornell U. Prof., Agricultural and Biological Engineering
Aldwinckle, Herbert S., Ph.D., U. of London (England). Prof., Plant Pathology (Geneva)
Allee, David J., Ph.D., Cornell U. Prof., Applied Economics and Management
Altman, Naomi S., Ph.D., Stanford U. Assoc. Prof., Biometrics
Andersen, Robert L., Ph.D., U. of Minnesota. Prof., Horticultural Sciences (Geneva)
Anderson, Bruce L., Ph.D., U. of California at Berkeley. Assoc. Prof., Applied Economics and Management
Aneshansley, Daniel J., Ph.D., Cornell U. Assoc. Prof., Agricultural and Biological Engineering
Arneson, Phil A., Ph.D., U. of Wisconsin. Assoc. Prof., Plant Pathology
Austic, Richard E., Ph.D., U. of California at Davis. Prof., Animal Science
Baer, Richard A., Ph.D., Harvard U. Prof., Natural Resources
Baeumner, Antje J., Ph.D., U. Stuttgart. Asst. Prof., Agricultural and Biological Engineering
Bain, Mark B., Ph.D., U. of Massachusetts. Assoc. Prof., Natural Resources
Barbano, David M., Ph.D., Cornell U. Prof., Food Science
Barrett, Christopher B., Ph.D., U. of Wisconsin. Assoc. Prof., Applied Economics and Management
Bartsch, James A., Ph.D., Purdue U. Assoc. Prof., Agricultural and Biological Engineering
Bassuk, Nina L. Ph.D., U. of London (England). Prof., Horticulture
Batt, Carl A., Ph.D., Rutgers U. Prof., Food Science
Baugher, Sherene, Ph.D., SUNY Stonybrook. Assoc. Prof., Landscape Architecture
Bauman, Dale E., Ph.D., U. of Illinois. Prof., Animal Science
Baveye, Philippe C., Ph.D., U. of California at Riverside. Assoc. Prof., Crop and Soil Sciences
Beer, Steven V., Ph.D., U. of California at Davis. Assoc. Prof., Plant Pathology
Bell, Alan W., Ph.D., U. of Glasgow (Scotland). Prof., Animal Science
Bellinder, Robin R., Ph.D., Virginia Polytechnic Inst. and State U. Prof., Horticulture
Bergstrom, Gary C., Ph.D., U. of Kentucky. Prof., Plant Pathology
Bills, Nelson L., Ph.D., Washington State U. Prof., Applied Economics and Management
Bjorkman, Thomas N., Ph.D., Cornell U. Assoc. Prof., Horticultural Sciences (Geneva)
Blake, Robert W., Ph.D., North Carolina State U. Prof., Animal Science
Blossey, Bernd, Ph.D., Christian-Albrechts U., Germany. Asst. Prof., Natural Resources
Boisclair, Yves R., Ph.D., Cornell U. Assoc. Prof., Animal Science
Boisvert, Richard N., Ph.D., U. of Minnesota. Prof., Applied Economics and Management
Boor, Kathryn J., Ph.D., U. of California at Davis. Assoc. Prof., Food Science
Brady, John W., Jr., Ph.D., SUNY at Stonybrook. Prof., Food Science
Brown, Dan L., Ph.D., Cornell U. Assoc. Prof., Animal Science
Brown, David L., Ph.D., U. of Wisconsin. Professor, Rural Sociology
Brown, Susan K., Ph.D., U. of California at Davis. Assoc. Prof., Horticultural Sciences (Geneva)
Bryant, Ray B., Ph.D., Purdue U. Prof., Crop and Soil Sciences
Burr, Thomas J., Ph.D., U. of California at Berkeley. Prof., Plant Pathology (Geneva)
Butler, Walter R., Ph.D., Purdue U. Prof., Animal Science
Calderone, Nicholas W., Ph.D., Ohio State U. Asst. Prof., Entomology
Campo, Michelle L., Ph.D., Michigan State U. Asst. Prof., Communication
Carlsen, William S., Ph.D., Stanford U. Assoc. Prof., Education
Castillo-Chavez, Carlos, Ph.D., U. of Wisconsin. Prof., Biometrics
Chan, Alice P., Ph.D., Michigan State U. Asst. Prof., Communication
Chapman, Lewis D., Ph.D., U. of California at Berkeley. Prof., Applied Economics and Management
Chase, Larry E., Ph.D., Pennsylvania State U. Assoc. Prof., Animal Science
Chau, Ho Yan, Ph.D., John Hopkins U. Asst. Prof., Applied Economics and Management
Cheng, Lailiang, Ph.D., Oregon State U. Asst. Prof., Horticulture
Cherney, Jerome H., Ph.D., U. of Minnesota. Prof., Crop and Soil Sciences
Christy, Ralph D., Ph.D., Michigan State U. Prof., Applied Economics and Management
Coffman, W. Ronnie, Ph.D., Cornell U. Prof., Plant Breeding
Collmer, Alan R., Ph.D., Cornell U. Prof., Plant Pathology
Colucci, Stephen J., Ph.D., SUNY. Prof., Earth and Atmospheric Sciences
Conrad, Jon M., Ph.D., U. of Wisconsin. Prof., Applied Economics and Management
Conroy, Carol A., Ph.D., Pennsylvania State U. Asst. Prof., Education
Contreras, Martha, Ph.D., U. of California at Riverside. Asst. Prof., Biometrics
Cooch, Evan G., Ph.D., Queen's U. Asst. Prof., Natural Resources
Cook, Kerry H., Ph.D., North Carolina State U. Assoc. Prof., Earth and Atmospheric Sciences
Cooke, J. Robert, Ph.D., North Carolina State U. Prof., Agricultural and Biological Engineering
Cox, William J., Ph.D., Oregon State U. Prof., Crop and Soil Sciences
Currie, W. Bruce, Ph.D., Macquarie U. (Australia) Prof., Animal Science
Curtis, Paul D., Ph.D., North Carolina State U. Asst. Prof., Natural Resources
Danforth, Bryan N., Ph.D., U. of Kansas. Asst. Prof., Entomology
Datta, Ashim K., Ph.D., U. of Florida. Prof., Agricultural and Biological Engineering
Decker, Daniel J., Ph.D., Cornell U. Prof., Natural Resources
DeGloria, Stephen D., Ph.D., U. of California at Berkeley. Assoc. Prof., Crop and Soil Sciences
de Gorter, Harry, Ph.D., U. of California at Berkeley. Assoc. Prof., Applied Economics and Management
DeJong, Walter S., Ph.D., U. of Wisconsin. Asst. Prof., Plant Pathology
Delaney, Terrence, Ph.D., U. of Washington. Asst. Prof., Plant Pathology
Dillard, Helene R., Ph.D., U. of California at Davis. Prof., Plant Pathology (Geneva)
DiTommaso, Antonio, Ph.D., McGill U. Asst. Prof., Crop and Soil Sciences
Dunn, James A., Ph.D., U. of Michigan. Prof., Education
Durst, Richard A., Ph.D., Massachusetts Institute of Technology. Prof., Food Science and Technology (Geneva)
Duxbury, John M., Ph.D., U. of Birmingham (England). Prof., Crop and Soil Sciences
Earle, Elizabeth D., Ph.D., Harvard U. Prof., Plant Breeding
Eberts, Paul R., Ph.D., U. of Michigan. Prof., Rural Sociology
Ellerbrock, LeRoy A., Ph.D., Cornell U. Assoc. Prof., Horticulture
Eloundou-Enyegue, Parfait M., Ph.D., Pennsylvania State U. Asst. Prof., Rural Sociology
English-Loeb, Gregory M., Ph.D., U. of California at Davis. Assoc. Prof., Entomology (Geneva)
Everett, Robert W., Ph.D., Michigan State U. Prof., Animal Science
Ewer, John, Ph.D., Brandeis U. Asst. Prof., Entomology
Ewert, D. Merrill, Ph.D., U. of Wisconsin. Assoc. Prof., Education
Fahey, Timothy J., Ph.D., U. of Wyoming. Prof., Natural Resources
Feldman, Shelley, Ph.D., U. of Connecticut. Assoc. Prof., Rural Sociology
Fernandes, Erick C. M., Ph.D., North Carolina State U. Asst. Prof., Crop and Soil Sciences
Fick, Gary W., Ph.D., U. of California at Davis. Prof., Crop and Soil Sciences
Forsline, Philip L., M.S., U. of Minnesota. Asst. Prof., Horticultural Sciences (Geneva)
Fox, Danny G., Ph.D., Ohio State U. Prof., Animal Science
Francis, Joe D., Ph.D., U. of Missouri. Assoc. Prof., Rural Sociology
Fry, William E., Ph.D., Cornell U. Prof., Plant Pathology
Galton, David M., Ph.D., Ohio State U. Prof., Animal Science

Gavin, Thomas A., Ph.D., Oregon State U. Assoc. Prof., Natural Resources
Gay, Geraldine K., Ph.D., Cornell U. Assoc. Prof., Communication
Gebremedhin, Kifle G., Ph.D., U. of Wisconsin. Prof., Agricultural and Biological Engineering
Geisler, Charles C., Ph.D., U. of Wisconsin. Prof., Rural Sociology
Gellert, Paul K., Ph.D., U. of Wisconsin. Asst. Prof., Rural Sociology
Gilbert, Cole, Ph.D. U. of Kansas. Assoc. Prof., Entomology
Gillett, James W., Ph.D., U. of California at Berkeley. Prof., Natural Resources
Gleason, Kathryn L., Ph.D., Oxford U. Assoc. Prof., Landscape Architecture
Gloy, Brent A., Ph.D., Purdue U. Asst. Prof., Applied Economics and Management
Gonsalves, Dennis, Ph.D., U. of California at Davis. Prof., Plant Pathology (Geneva)
Good, George L., Ph.D., Cornell U. Prof., Horticulture
Gorewit, Ronald C., Ph.D., Michigan State U. Prof., Animal Science
Gottfried, Herbert W., Ph.D., Ohio U. Prof., Landscape Architecture
Gravani, Robert B., Ph.D., Cornell U. Prof., Food Science
Griffths, Phillip D., Ph.D., U. of Florida. Asst. Prof., Horticultural Sciences (Geneva)
Gurak, Douglas T., Ph.D., U. of Wisconsin. Prof., Rural Sociology
Hagen, James M., Ph.D., U. of Illinois. Asst. Prof., Applied Economics and Management
Hahn, Russell R., Ph.D., Texas A & M U. Assoc. Prof., Crop and Soil Sciences
Haith, Douglas A., Ph.D., Cornell U. Prof., Agricultural and Biological Engineering
Hajek, Ann E., Ph.D., U. of California at Berkeley. Assoc. Prof., Entomology
Halseth, Donald E., Ph.D., Cornell U. Assoc. Prof., Horticulture
Hang, Yong D., Ph.D., McGill U. (Canada). Prof., Food Science and Technology (Geneva)
Harman, Gary E., Ph.D., Oregon State U. Prof., Horticultural Sciences (Geneva)
Hedlund, Dalva E., Ph.D., Colorado State U. Assoc. Prof., Education
Henick-Kling, Thomas, Ph.D., U. of Adelaide (Australia). Assoc. Prof., Food Science and Technology (Geneva)
Hintz, Harold F., Ph.D., Cornell U. Prof., Animal Science
Hirschl, Thomas A., Ph.D., U. of Wisconsin. Prof., Rural Sociology
Hoch, Harvey, Ph.D., U. of Wisconsin. Prof., Plant Pathology (Geneva)
Hodge, Kathie, Ph.D., Cornell U. Asst. Prof., Plant Pathology
Hoffmann, Michael P., Ph.D., U. of California. Assoc. Prof., Entomology
Horrigan, Paula H., M.L.A., Cornell U. Assoc. Prof., Landscape Architecture
Hotchkiss, Joseph H., Ph.D., Oregon State U. Prof., Food Science
Hrazdina, Geza, Ph.D., Eidg. Technische Hochschule at Zürich (Switzerland). Prof., Food Science and Technology (Geneva)
Hudler, George W., Ph.D., Colorado State U. Prof., Plant Pathology
Hullar, Theodore L., Ph.D., U. of Minnesota. Prof., Natural Resources
Hunter, James E., Ph.D., U. of New Hampshire. Prof., Plant Pathology (Geneva)
Hunter, Jean B., D.En.Sc., Columbia U. Assoc. Prof., Agricultural and Biological Engineering
Irwin, Lynne H., Ph.D., Texas A & M U. Assoc. Prof., Agricultural and Biological Engineering
Jahn, Margaret M., Ph.D., Cornell U. Assoc. Prof., Plant Breeding
Jewell, William J., Ph.D., Stanford U. Prof., Agricultural and Biological Engineering
Johnson, Patricia A., Ph.D., Cornell U. Assoc. Prof., Animal Science
Kaiser, Harry M., Ph.D., U. of Minnesota. Assoc. Prof., Applied Economics and Management
Kanbur, Sanjiv Madhwarao, Ph.D., Oxford. Prof., Applied Economics and Management
Keshavarz, Kavous, Ph.D., U. of Georgia. Prof., Animal Science
Knapp, Warren W., Ph.D., U. of Wisconsin. Prof., Earth and Atmospheric Sciences
Knipple, Douglas C., Ph.D., Cornell U. Assoc. Prof., Entomology (Geneva)
Knoblauch, Wayne A., Ph.D., Michigan State U. Prof., Applied Economics and Management
Knuth, Barbara A., Ph.D., Virginia Polytechnical Inst. and State U. Assoc. Prof., Natural Resources
Koeller, Wolfram, Ph.D., Phillips-University-Marburg (Germany). Prof., Plant Pathology (Geneva)
Kraft, Clifford E., Ph.D., U. of Wisconsin. Asst. Prof., Natural Resources
Krall, Daniel W., M.L.A. Cornell U. Assoc. Prof., Landscape Architecture
Krasny, Marianne E., Ph.D., U. of Washington. Assoc. Prof., Natural Resources
Kresovich, Stephen, Ph.D., Ohio State U. Prof., Plant Breeding
Krikorian, Dean H., Ph.D., Cornell U. Asst. Prof., Communication
Kroma, Margaret M., Ph.D., Iowa State U. Asst. Prof., Education
Kyle, Steven C., Ph.D., Harvard U. Assoc. Prof., Applied Economics and Management
LaDue, Eddy L., Ph.D., Michigan State U. Prof., Applied Economics and Management
Lakso, Alan N., Ph.D., U. of California at Davis. Prof., Horticultural Sciences (Geneva)
Lassoie, James P., Ph.D., U. of Washington. Prof., Natural Resources
Lawless, Harry T., Ph.D., Brown U. Prof., Food Science
Lazarowitz, Sondra G., Ph.D., Rockefeller U. Prof., Plant Pathology
Lee, Chang Y., Ph.D., Utah State U. Prof., Food Science and Technology (Geneva)
Lee, David R., Ph.D., U. of Wisconsin. Prof., Applied Economics and Management
Lei, Xingen, Ph.D., Michigan State U. Assoc. Prof., Animal Science
Lesser, William H., Ph.D., U. of Wisconsin. Prof., Applied Economics and Management
Lewenstein, Bruce V., Ph.D., U. of Pennsylvania. Assoc. Prof., Communication
Liebherr, James K., Ph.D., U. of California at Berkeley. Prof., Entomology
Liu, Ruihai, Ph.D., Cornell U. Asst. Prof., Food Science
Lorbeer, James W., Ph.D., U. of California at Berkeley. Prof., Plant Pathology
Loria, Rosemary, Ph.D., Michigan State U. Prof., Plant Pathology
Losey, John E., Ph.D., U. of Maryland. Asst. Prof., Entomology
Lyson, Thomas A., Ph.D., Michigan State U. Prof., Rural Sociology
Martin, Gregory B., Ph.D., Michigan State U. Prof., Plant Pathology
McBride, Murray B., Ph.D., Michigan State U. Prof., Crop and Soil Sciences
McCouch, Susan, Ph.D., Cornell U. Assoc. Prof., Plant Breeding
McFerson, James R., Ph.D., U. of Wisconsin. Asst. Prof., Horticultural Sciences (Geneva)
McGrath, Margaret T., Ph.D., Pennsylvania State U. Assoc. Prof., Plant Pathology
McLaughlin, Edward W., Ph.D., Michigan State U. Prof., Applied Economics and Management
McMichael, Philip D., Ph.D., SUNY Binghamton. Prof., Rural Sociology
Meloy, Margaret G., Ph.D., Cornell U. Asst. Prof., Applied Economics and Management
Merwin, Ian A., Ph.D., Cornell U. Assoc. Prof., Horticulture
Milgroom, Michael G., Ph.D., Cornell U. Prof., Plant Pathology
Miller, Dennis D., Ph.D., Cornell U. Prof., Food Science
Miller, William B., Ph.D., Cornell U. Prof., Horticulture
Milligan, Robert A., Ph.D., U. of California at Davis. Prof., Applied Economics and Management
Montemagno, Carlo D., Ph.D., U. of Notre Dame. Assoc. Prof., Agricultural and Biological Engineering
Mount, Timothy D., Ph.D., U. of California at Berkeley. Prof., Applied Economics and Management
Mt Pleasant, Jane, Ph.D., North Carolina State U. Assoc. Prof., Crop and Soil Sciences
Mudge, Kenneth W., Ph.D., Washington State U. Assoc. Prof., Horticulture
Mulvaney, Steven J., Ph.D., Cornell U. Assoc. Prof., Food Science
Mutschler, Martha A., Ph.D., U. of Wisconsin. Prof., Plant Breeding
Nelson, Eric B., Ph.D., Ohio State U. Assoc. Prof., Plant Pathology
Ng, David T., Ph.D., Columbia U. Asst. Prof., Applied Economics and Management
Nielsen, Rasmus, Ph.D., U. of California at Berkeley. Asst. Prof., Biometrics
Novakovic, Andrew M., Ph.D., Purdue U. Prof., Applied Economics and Management
Nyrop, Jan P., Ph.D., Michigan State U. Prof., Entomology (Geneva)
Obendorf, Ralph L., Ph.D., U. of California at Davis. Prof., Crop and Soil Sciences
Oltenacu, Elizabeth A., Ph.D., U. of Minnesota. Assoc. Prof., Animal Science
Oltenacu, Pascal A., Ph.D., U. of Minnesota. Prof., Animal Science
Ostman, Ronald E., Ph.D., U. of Minnesota. Prof., Communication
Overton, Thomas R., Ph.D., U. of Illinois. Asst. Prof., Animal Science
Padilla-Zakour, Olga, Ph.D., Cornell U. Asst. Prof., Food Science and Technology (Geneva)
Parks, John E., Ph.D., Virginia Polytechnic Inst. Assoc. Prof., Animal Science
Parlange, Jean-Yves, Ph.D., Brown U. Prof., Agricultural and Biological Engineering
Peckarsky, Barbara L., Ph.D., U. of Wisconsin. Prof., Entomology
Pell, Alice N., Ph.D., U. of Vermont. Prof., Animal Science
Peters, Scott J., Ph.D., U. of Minnesota. Asst. Prof., Education
Petrovic, A. Martin, Ph.D., Michigan State U. Prof., Horticulture
Pfeffer, Max, Ph.D., U. of Wisconsin. Assoc. Prof., Rural Sociology
Poe, Gregory, Ph.D., U. of Wisconsin. Assoc. Prof., Applied Economics and Management
Pollak, E. John, Ph.D., Iowa State U. Prof., Animal Science

Pool, Robert M., Ph.D., Cornell U. Prof., Horticultural Sciences (Geneva)
Posner, George J., Ed.D., SUNY at Albany. Prof., Education
Price, Hugh C., Ph.D., Michigan State U. Prof., Horticultural Sciences (Geneva)
Pritts, Marvin P., Ph.D., Michigan State U. Prof., Horticulture
Quaas, Richard L., Ph.D., Colorado State U. Prof., Animal Science
Quirk, Susan M., Ph.D., Cornell U. Assoc. Prof., Animal Science
Rakow, Donald A., Ph.D., Cornell U. Assoc. Prof., Horticulture
Raman, Kandukuri, Ph.D., U. of Reading. Prof., Plant Breeding
Rangarajan, Anusuya, Ph.D., Ohio State. Asst. Prof., Horticulture
Ranney, Christine K., Ph.D., U. of California at Davis. Assoc. Prof., Applied Economics and Management
Rao, M. Anandha, Ph.D., Ohio State U. Prof., Food Science and Technology (Geneva)
Regenstein, Joe M., Ph.D., Brandeis U. Prof., Food Science
Reid, W. Shaw, Ph.D., Michigan State U. Prof., Crop and Soil Sciences
Reiners, Stephen, Ph.D., Ohio State U. Assoc. Prof., Horticultural Sciences (Geneva)
Reisch, Bruce, Ph.D., U. of Wisconsin. Prof., Horticultural Sciences (Geneva)
Reissig, William H., Ph.D., Oregon State U. Prof., Entomology (Geneva)
Richmond, Milo E., Ph.D., U. of Missouri. Assoc. Prof., Natural Resources
Riha, Susan, Ph.D., Washington State U. Prof., Earth and Atmospheric Sciences
Ripple, Richard E., Ph.D., U. of Wisconsin. Prof., Education
Rizvi, Syed S., Ph.D., Ohio State. Prof., Food Science
Roberts, John S., Ph.D., Rutgers U. Asst. Prof., Food Science and Technology (Geneva)
Robinson, Richard W., Ph.D., Cornell U. Prof., Horticultural Sciences (Geneva)
Robinson, Terence L., Ph.D., Washington State U. Assoc. Prof., Horticultural Sciences (Geneva)
Roelofs, Wendell L., Ph.D., Indiana U. Prof., Entomology (Geneva)
Rosenberger, David A., Ph.D., Michigan State U. Prof., Plant Pathology (Geneva)
Rossi, Frank S., Ph.D., Cornell U. Asst. Prof., Horticulture
Rutz, Donald A., Ph.D., North Carolina State U. Prof., Entomology
Sanderson, John P., Ph.D., U. of California at Riverside. Prof., Entomology
Sanford, John C., Ph.D., U. of Wisconsin. Assoc. Prof., Horticultural Sciences (Geneva)
Scherer, Clifford W., Ph.D., U. of Wisconsin. Assoc. Prof., Communication
Scheufele, Dietram A., Ph.D., U. of Wisconsin. Asst. Prof., Communication
Schneider, Rebecca, Ph.D., Cornell U. Asst. Prof., Natural Resources
Schrader, Dawn E., Ph.D., Harvard U. Assoc. Prof., Education
Schulze, William D., Ph.D., U. of California at Riverside. Prof., Applied Economics and Management
Schupp, James R., Ph.D., Ohio State U., Asst. Prof., Horticultural Sciences (Geneva)
Schwager, Steven J., Ph.D., Yale U. Assoc. Prof., Biometrics
Scott, Jeffrey G., Ph.D., U. of California at Berkeley. Prof., Entomology
Scott, Norman R., Ph.D., Cornell U. Prof., Agricultural and Biological Engineering
Seem, Robert C., Ph.D., Pennsylvania State U. Prof., Plant Pathology (Geneva)
Setter, Timothy L., Ph.D., U. of Minnesota. Assoc. Prof., Crop and Soil Sciences
Shanahan, James E., Ph.D., U. of Massachusetts-Amherst. Assoc. Prof., Communication
Shapiro, Michael A., Ph.D., U. of Wisconsin. Assoc. Prof., Communication
Shelton, Anthony M., Ph.D., U. of California at Riverside. Prof., Entomology (Geneva)
Shields, Elson J., Ph.D., U. of Wisconsin. Prof., Entomology
Siebert, Karl J., Ph.D., Pennsylvania State U. Prof., Food Science and Technology (Geneva)
Sipple, John W., Ph.D., U. of Michigan. Asst. Prof., Education
Smith Einarson, Margaret E., Ph.D., Cornell U. Assoc. Prof., Plant Breeding
Smith, R. David, Ph.D., Cornell U. Assoc. Prof., Animal Science
Soderlund, David M., Ph.D., U. of California at Berkeley. Prof., Entomology (Geneva)
Sorrells, Mark E., Ph.D., U. of Wisconsin. Prof., Plant Breeding
Steenhuis, Tammo S., Ph.D., U. of Wisconsin. Prof., Agricultural and Biological Engineering
Steponkus, Peter L., Ph.D., Purdue U. Prof., Crop and Soil Sciences
Straub, Richard W., Ph.D., U. of Missouri. Prof., Entomology (Geneva)
Streeter, Deborah H., Ph.D., U. of Wisconsin. Assoc. Prof., Applied Economics and Management
Sullivan, Patrick J., Ph.D., U. of Washington. Asst. Prof., Natural Resources
Sutphin, H. Dean, Ph.D., Ohio State U. Assoc. Prof., Education
Tanksley, Steven D. Ph.D., U. of California at Davis. Prof., Plant Breeding
Tauer, Loren W., Ph.D., Iowa State U. Prof., Applied Economics and Management
Taylor, Alan G., Ph.D., Oklahoma State U. Prof., Horticultural Sciences (Geneva)
Thies, Janice E., Ph.D., U. of Hawaii. Assoc. Prof., Crop and Soil Sciences
Thonney, Michael L., Ph.D., U. of Minnesota. Prof., Animal Science
Timmons, Michael B., Ph.D., Cornell U. Prof., Agricultural and Biological Engineering
Tingey, Ward M., Ph.D., U. of Arizona. Prof., Entomology
Topoleski, Leonard D., Ph.D., Purdue U. Prof., Horticulture
Trancik, Roger T., M.L.A., Harvard U. Prof., Landscape Architecture
Trowbridge, Peter J., M.L.A., Harvard U. Prof., Landscape Architecture
Trumbull, Deborah J., Ph.D., U. of Illinois. Assoc. Prof., Education
Turgeon, B. Gillian, Ph.D., U. of Dayton. Assoc. Prof., Plant Pathology
VanAmburgh, Michael E., Ph.D., Cornell U. Asst. Prof., Animal Science
vanEs, Harold M., Ph.D., North Carolina State U. Assoc. Prof., Crop and Soil Sciences
Viands, Donald R., Ph.D., U. of Minnesota. Prof., Plant Breeding
Villani, Michael G., Ph.D., North Carolina State U. Prof., Entomology (Geneva)
Walker, Larry P., Ph.D., Michigan State U. Prof., Agricultural and Biological Engineering
Walter, Michael F., Ph.D., U. of Wisconsin. Prof., Agricultural and Biological Engineering
Wang, Shou E., Ph.D., Princeton. Asst. Prof., Applied Economics and Management
Watkins, Christopher B., Rutgers U. Assoc. Prof., Horticulture
Weber, Courtney A., Ph.D., U. of Florida. Asst. Prof., Horticultural Sciences (Geneva)
Weiler, Thomas C., Ph.D., Cornell. Prof., Horticulture
Welch, Ross M., Ph.D., U. of California at Davis. Prof., Crop and Soil Sciences
Weston, Leslie A., Ph.D., Michigan State U. Assoc. Prof., Horticulture
Wheeler, Quentin D., Ph.D., Ohio State U. Prof., Entomology
White, Gerald B., Ph.D., Pennsylvania State U. Prof., Applied Economics and Management
Whitlow, Thomas H., Ph.D., U. of California at Davis. Assoc. Prof., Horticulture
Wiedmann, Martin, Ph.D., Cornell U. Asst. Prof., Food Science
Wien, Hans C., Ph.D., Cornell U. Prof., Horticulture
Wilcox, Wayne F., Ph.D., U. of California at Davis. Prof., Plant Pathology (Geneva)
Wilks, Daniel S., Ph.D., Oregon State U. Prof., Earth and Atmospheric Sciences
Williams, Linda, Ph.D., Brown U. Assoc. Prof., Rural Sociology
Wilson, Arthur L., Ph.D., U. of Georgia. Asst. Prof., Education
Wolfe, David W., Ph.D., U. of California at Davis. Assoc. Prof., Horticulture
Worobo, Randy W., Ph.D., U. of Alberta. Asst. Prof., Food Science and Technology (Geneva)
Yavitt, Joseph B., Ph.D., U. of Wyoming. Assoc. Prof., Natural Resources
Zitter, Thomas A., Ph.D., Michigan State U. Prof., Plant Pathology

COLLEGE OF ARCHITECTURE, ART, AND PLANNING

ADMINISTRATION

Porus Olpadwala, dean

John E. Zissovici, associate dean

Walter C. Williams, director of alumni affairs and development

Cynthia K. Prescott, director of administration and finance

Leon Lawrence, director of minority educational affairs

Jayne A. Worden, registrar

Elizabeth A. Cutter, director of student services and admissions

Margaret Webster, curator of visual resources facility

M. Susan Lewis, director of career services

FACULTY ADVISERS

Architecture students are assigned faculty advisers. Juniors and seniors have one assigned adviser and are also invited to share their concerns with and to seek advice from the most appropriate faculty member or college officer, including the registrar, the department chair, and the dean.

Students in the fine arts department are assigned a faculty adviser for the first year. After the first year, students may select their advisers. Students are required to have an adviser throughout their program in their area of concentration.

Undergraduate students in the Program of Urban and Regional Studies are assigned faculty advisers.

All students in the college are invited to share their concerns and seek advice from the volunteer student advisers at anytime.

Specific inquiries regarding rules, procedures, or deadlines should be addressed to:

Mark Cruvellier, chair, Department of Architecture

Pierre Clavel, chair, Department of City and Regional Planning

Roberto Bertoia, chair, Department of Art

DEGREE PROGRAMS

	Degree
Architecture	B.Arch.
	B.F.A.
Fine Arts	B.F.A.
History of Architecture and Urbanism	B.S.
Urban and Regional Studies	B.S.

The college offers programs leading to the bachelor's degree—the five-year program in architecture leads to the Bachelor of Architecture; four-year programs in art and architecture lead to the Bachelor of Fine Arts. In addition, four-year programs with a concentration in either urban and regional studies or history of architecture lead to the Bachelor of Science.

Graduate-level programs are offered in art, architectural design and urban design, architectural sciences, history of architecture and urbanism, historic preservation planning, city and regional planning, regional science, and landscape architecture.

Students in each of these programs work in physical proximity to one another and thus gain a broader understanding of their own special area of interest through contact with students and faculty from other disciplines.

Early in its development, the college set a limit on the number of students it would enroll and devised a selective method of admission. There are now more than 650 students and a full-time teaching staff of over sixty, supplemented by visiting professors and critics, part-time lecturers, and assistants. Teachers and students mix freely, and much instruction and criticism is on an individual basis.

The college's courses are integral parts of the professional curricula. Fundamental subjects are taught by faculty members whose experience provides them with professional points of view. The concentration of professional courses within the college is balanced by the breadth of view gained from courses and informal learning in the rest of the university. The college believes that this breadth is an essential element of professional education. This conviction is evident in the form of the curriculum, the methods of teaching, and the extracurricular life of teachers and students.

FACILITIES

The college occupies Sibley Hall, Olive Tjaden Hall, Rand Hall, and the Foundry. Facilities for architecture and city and regional planning, as well as college administrative offices, the Visual Resources Facility, and the Fine Arts Library, are located in Sibley Hall. The Department of Art is housed in Olive Tjaden Hall. Sculpture facilities are in the Foundry and shop facilities in Rand. The Green Dragon Cafe, a student eatery and lounge, is located in the lower level of Sibley Dome. There are darkrooms in the Department of Art that are available for general use by students in the college and are primarily used as laboratories for the photography courses. A darkroom fee must be paid by each user. Information about darkroom rules and regulations, hours, and equipment is available at the darkroom circulation desk.

Through the generosity of the late Lillian P. Heller, the college also owns the Miller-Heller House, home of William H. Miller, the first student to enroll for the study of architecture at Cornell, and later a practicing architect in Ithaca. This building is used to house visiting teachers and guests of the college and for occasional receptions and social events.

Libraries

The Fine Arts Library in Sibley Hall serves the College of Architecture, Art, and Planning through its collections on architecture, fine arts, city and regional planning, and landscape architecture. The library, with more than 177,000 books, is capable of supporting undergraduate, graduate, and research programs. Some 1,200 serials are currently received and maintained.

The Visual Resources Facility, made possible through gifts from George and Adelaide Knight, is located in Sibley Hall and contains the F. M. Wells Memorial Slide Collection, which consists of a large and growing collection of slides of architecture, architectural history, and art. The collection now includes approximately 450,000 slides.

The facilities of the libraries of other schools and departments on campus and the John M. Olin Library, designed primarily as a research library for graduate students, are also available.

Museums and Galleries

The Herbert F. Johnson Museum of Art was formally opened in May 1973. Although many of its exhibitions and activities relate directly to academic programs of the university, the museum has no administrative affiliation with any department. In this way, its programs freely cross academic boundaries, stimulating interchange among disciplines. With a strong and varied collection and a continuous series of high-quality exhibitions, it fulfills its mission as a center for the visual arts at Cornell. Throughout the year, works of students, faculty, and staff in the College of Architecture, Art, and Planning and of guest artists may be viewed in the John Hartell Gallery in Sibley Dome and in the Olive Tjaden Gallery in Olive Tjaden Hall. Art galleries are also maintained in Willard Straight Hall, where loan exhibitions of paintings and graphic work by contemporary artists are held.

Rome Program

The College of Architecture, Art, and Planning's Rome Program was founded in the fall of 1986 to provide instruction in Italy for students seeking excellence in art, architecture, and other disciplines. The program offers an educational experience that draws upon the rich past of Rome, its resources in museums, its art and architecture, and its wide variety of cultural offerings. The school is located in the restored 17th century Palazzo Lazzaroni in the center of the eternal city next to such well-known Roman sights as Piazza Navona, the Pantheon, and Rome's famous outdoor market at the Campo dei Fiori.

The program in Rome offers components for students majoring in architecture, fine arts, planning, and liberal arts. Full course loads are available to all students in a curriculum that stresses the convergence of artistic, cultural, and architectural ideas vital to an understanding of the city. Students are responsible for planning course schedules that

ensure their particular requirements can be met, since course offerings in Rome are limited. For additional information, see individual department listings or contact the Rome Program Office, 149 East Sibley Hall.

COLLEGE ACADEMIC POLICIES

Ownership of Student Work

All drawings, models, paintings, graphic art, and sculpture done in the studios and drafting rooms as a part of the instructional program are the property of the college until they have been graded and released by the instructor. Certain works may be selected by the college for retention for academic purposes.

Exhibitions of Student Work

Exhibitions of student work are held each semester as part of the yearly schedule of the Olive Tjaden Gallery and the John Hartell Gallery in Sibley Dome. These galleries display work from a specific course or exhibit examples of recent work by individual faculty, students, and visitors.

Scholastic Standards

Term by term, a candidate for an undergraduate degree in the college is required to pass all courses in which the student is registered and have an average for the term of not less than C (2.0). The record of each student who falls below the standard will be reviewed by the Student Records Committee for appropriate action, as described below:

1) Warning means that the student's performance is not up to expectations. Unless improvement is shown in the subsequent term, the student may be placed on final warning or required to take a leave of absence from the college.
2) Final Warning indicates that the student's record is unsatisfactory. Unless considerable improvement is shown in the subsequent term, the student shall be required to take a leave of absence from the college.
3) Required leave of absence: academic deficiency. The student is dismissed from the college and may not continue studies in the college. A student who has been placed on a required leave of absence may apply for readmission after a leave of absence of at least two semesters. Application for readmission is made by letter addressed to the college's Student Records Committee. The student must submit evidence that the time has been well used, and if employed, must submit a letter from the employer(s). If a student chooses to enroll in courses at an institution other than Cornell while on required leave, credit is not granted automatically. Upon receiving permission to return, a student must petition the department to request credit for courses taken elsewhere. Students on required leave are not allowed to register extramurally at Cornell as the intention of the required leave is to insist upon a break from study at Cornell. The grades received for any courses taken while on a required leave of absence will not be counted into the grade point average. Readmission to the college is at the discretion of the Student Records Committee. Application for spring-term readmission must be made by November 15, and application for fall-term readmission must be made by April 15. Refer to the Architecture, Art, & Planning Handbook (Whitebook) for further information regarding required leaves of absence.
4) Required withdrawal: may not reregister in the College of Architecture, Art, and Planning. The student is dismissed from the college and is permanently prohibited from continuing studies in it. This dismissal does not preclude the possibility of applying for admission to another division of the university.

The above actions are not necessarily sequential. A student who has received a warning may be placed on a required leave of absence for academic deficiency at the end of the next term if performance during that time is deemed to be grossly deficient.

A cumulative average of at least C– (1.7) is required for graduation.

ARCHITECTURE

Chair, TBA; L. Briggs, L. Chi, M. Curry, F. Davis, W. Goehner, D. P. Greenberg, G. Hascup, K. Hubbell, D. M. Lasansky, D. J. Lewis, B. G. MacDougall, A. B. Mackenzie, J. C. Miller, L. Mirin, V. Mulcahy, J. Ochshorn, C. F. Otto, A. Ovaska, C. W. Pearman, H. W. Richardson, M. Schack, A. Simitch, V. K. Warke, J. Wells, M. Woods, J. Zissovici

Professional Degree Program

The first professional degree in architecture is the Bachelor of Architecture. This degree counts toward the professional registration requirements established by the various states, National Architectural Accrediting Board, and the National Council of Architectural Registration Boards. The professional program is normally five years in length and is designed particularly for people who, before they apply, have established their interest and motivation to enter the field. It therefore incorporates both a general and professional educational base.

The program is oriented toward developing the student's ability to deal creatively with architectural problems on analytical, conceptual, and developmental levels. The sequence courses in design, consisting of studio work augmented by lectures and seminars, are the core of the program. Sequences of studies in the history of architecture and cities, culture and society, architectural theory, visual studies, environmental controls, structures, construction and computer graphics, and applications provide a base for the work in design.

In the first three years, the student has the opportunity to establish a foundation in the humanities and sciences through electives. During the fourth and fifth years, this base may expand through further detailed studies in these areas. Within the professional program a basis for understanding architecture in its contemporary and historical cultural contexts is established.

The structure of the program incorporates considerable flexibility for the individual student to pursue his or her particular interest in the fourth and fifth years. By carefully planning options and electives in the fifth year, it is possible for a qualified student to apply the last year's work for the Bachelor of Architecture degree to one of the graduate programs offered in the department. Some students are then able to complete the requirements for the master's degree in one additional year.

Note on Professional Accreditation

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.

Master's degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. The preprofessional degree, however, is not, by itself, recognized as an accredited degree.

Rome Program

The program offers the opportunity for students from Cornell and other universities to spend one or two terms of study in Rome. This option is open to fourth- and fifth-year Cornell architecture students; outstanding third-year students are admitted by petition and a review of their design record. Courses offered by this department include design, thesis, thesis introduction, history, theory, architectural science, and visual studies. In addition, courses are offered by other departments in Italian language, Italian culture, and history of art. The program provides a unique urban and architectural experience drawing from the rich past of the city for sources of instruction and inspiration.

Overlap Program

For qualified students the department offers an option that combines the fifth year of the undergraduate program with the first year of the Master of Architecture program. In the fall of the fourth undergraduate year, interested students petition the department to substitute ARCH 601–602 or 603–604 for ARCH 501–502. At the same time, they complete graduate school applications and submit them with fee and portfolio to the graduate field assistant for architecture. Students accepted into the program may not normally begin until the fall of their fifth year and, once enrolled, may not transfer back into the 501–502 sequence.

Following admission into the Overlap Program, students may petition to apply toward the requirements of the master's degree a maximum of 30 credits, including ARCH 601–602 or 603–604 and other advanced courses taken in excess of distribution requirements for the Bachelor of Architecture degree.

Curriculum

First Year

Fall Term	*Credits*
101 Design I	6
181 History of Architecture I	3
151 Drawing I	2
Math 111 Calculus or Math 106 or out-of-college elective	3–4
Out-of-college elective	3
	17–18

Spring Term	
102 Design II	6
182 History of Architecture II	3
152 Drawing II	2
Math 111 or out-of-college elective	3–4
Out-of-college elective (freshman writing seminar suggested)	3
	17–18

Second Year

Fall Term	*Credits*
201 Design III	6
263 Structural Concepts	4
231 Architectural Analysis I	2
261 Site Planning	3
Out-of-college elective	3
	18

Spring Term	
202 Design IV	6
232 Architectural Analysis II	2
262 Building Technology, Materials, and Methods	3
264 Structural Elements	3
College elective	3
	17

Third Year

Fall Term	
301 Design V	6
361 Environmental Controls I—Lighting and Acoustics	3
363 Structural Systems	3
Departmental elective	3
Out-of-college elective	3
	18

Spring Term	
302 Design VI	6
342 Architecture as a Cultural System	3
362 Environmental Controls II—Mechanical and Passive Solar Systems	3
Departmental elective	3
College or out-of-college elective	3
	18

Fourth Year

Fall Term	
401 Design VII	6
411 Professional Practice	3
Departmental elective	3
College elective	3
Out-of-college elective	3
	18

Spring Term	
402 Design VIII	6
Departmental elective	3
Departmental elective	3
College or out-of-college elective	3
Out-of-college elective	3
	18

Fifth Year

Fall Term	*Credits*
501 Design IX or 601 or 603 Overlap Program	6
Departmental elective	3
College or out-of-college elective	3
Out-of-college elective	3
Out-of-college elective	3
	18

Spring Term	
502 Design X or 602 or 604 Overlap Program	8
Departmental elective	3
College or out-of-college elective	3
College or out-of-college elective	3
	17

Required Departmental Courses

Terms	*Course Subject*	*Numbers*	*Credits*
10	design	101–502	62
1	mathematics	Math 111, Math 106, or approved equivalent	3–4
3	structures	263, 264, 363	10
4	technology	261, 262, 361, 362	12
2	architectural theory	231, 232	4
2	history of architecture	181, 182	6
1	architecture, culture, and society	342	3
1	professional practice	411	3
2	drawing	151, 152	4
			107–108

Electives

Departmental Terms		*Credits*
3	history of architecture: 300-level	9
1	visual studies	3
2	architectural theory or 600-level design-related course	6
1	architectural structures, construction, or environmental controls	3
		21

College Terms		*Credits*
2	art: any studio courses	6

Out-of-College Terms		*Credits*
1	computer programming or applications	3
1	freshman seminar	3
1	mathematics, or physical or biological sciences	3
1	humanities	3
		12

Free	
Of the electives, 15 credits are to be taken outside the College of Architecture, Art, and Planning, and 15 credits may be taken either in or outside the college.	30
Total credits	176

Architecture Concentrations for Majors

The Department of Architecture recognizes any concentration earned within the university but outside of the department (using standards set by those departments) on the transcripts of its students.

It is often advantageous for undergraduates to concentrate in specific sub-disciplines of architecture, especially if they anticipate application to specialized graduate programs, therefore, the following concentrations in architecture are offered within the department for B.Arch. and B.F.A. in Architecture candidates only:

Architecture, Culture, and Society 342 (or equivalent), plus 9 credits in this area.

Architectural Science and Technology 261, 262, 263, 264, 361, 362, 363, distribution requirement (3 credits), plus 6 credits in this area.

History of Architecture 181, 182, distribution requirements (9 credits), plus 7 credits (including a 4 credit hour seminar course) in this area.

Theory of Architecture 231, 232, distribution requirements (6 credits), plus 6 credits in this area.

Visual Studies in Architecture 151, 152, distribution requirement (3 credits), plus 9 credits in this area.

Students wishing to receive recognition for a concentration, must submit a Concentration Request form to the Architecture Department Office. In order for a course to count toward a concentration, the student must receive a grade of C or better.

Transfer Students

Although the program leading to the Bachelor of Architecture is specifically directed to those who are strongly motivated to begin professional study when entering college, it is sufficiently flexible to allow transfers for students who have not made this decision until after they have been in another program for one or two years. Individuals who have already completed a nonprofessional undergraduate degree must also apply to transfer to the Bachelor of Architecture degree program, since the graduate program in architecture requires the Bachelor of Architecture degree or its equivalent for entrance.

Transfer students are responsible for completing that portion of the curriculum that has not been covered by equivalent work. Applicants who have had no previous work in architectural design must complete the 10-term design sequence. Since this sequence may be accelerated by attending summer terms, seven or eight regular terms and two or three summer terms are typically required.

Admission is offered to a limited number of transfer applicants who have completed a portion of their architecture studies in other schools. Each applicant's case is considered individually. Transfer students must complete a minimum of 70 credits and four terms in residence, taking 35 of the 70 credits (including four terms of design) in the Department of Architecture. Placement in the design sequence is based on a review of a representative portfolio of previous work.

For those who would benefit from an opportunity to explore the field of architecture before deciding on a commitment to professional education, the department offers an introductory summer program that includes an introductory studio in architectural design, lectures, and other experiences designed to acquaint participants with opportunities, issues, and methods in the field of architecture.

Alternative Programs

Bachelor of Fine Arts

After completing the first four years of requirements, the student may choose to receive the degree of Bachelor of Fine Arts (B.F.A.) in architecture, which is not a professional degree.

Bachelor of Science in History of Architecture

The history of architecture major leads to a Bachelor of Science degree, conferred by the College of Architecture, Art, and Planning. The major is intended for transfer students from other programs at Cornell and from colleges and universities outside Cornell. Students in the Department of Architecture and the College of Arts and Sciences may take the major as part of a dual-degree program. The course of study in this major, available to students from a variety of academic backgrounds, offers the opportunity for a vigorous exploration of architecture and its history.

Admission requirements. Two years of undergraduate study, ARCH 181 and 182 or the equivalent. Students transferring from a B.Arch. program must be in good standing in their design sequence.

Procedure. Students from Cornell may transfer to the program at the beginning of the fall term of their third or fourth year of study. They submit a short application as prospective internal transfer students. Before applying, all prospective internal transfer students meet with a history of architecture faculty member to discuss scheduling for the program.

Students who wish to transfer to the program from outside Cornell must apply to the Department of Architecture by March 15. Applications may be considered after this date but are given lower priority. Applications for both internal and external transfer students are available from the Admissions Office, College of Architecture, Art, and Planning, Cornell University, B-1 West Sibley Hall, Ithaca, NY 14853–6701.

Curriculum. A student entering the program is assigned an adviser from the history of architecture faculty in the Department of Architecture. Adviser and student together prepare an appropriate two-year course of study according to the following guidelines:

1) 24 credits of 300-level courses in architectural history: ARCH 380 through ARCH 399
2) 12 credits in 600-level architectural history seminars: ARCH 681 through ARCH 699; or 8 credits in a 600-level seminar plus ARCH 499, offered for honors candidates only
3) One 300-, 400-, or 600-level course in architectural theory
4) 24 credits in electives selected in consultation with the student's adviser
5) Language requirement, to be met in the manner specified for students enrolled in the College of Arts and Sciences

Honors program. Students graduate with honors if, during their two years of study in the program, they have a cumulative average of B or better in all courses, have no grade lower than A– in all history of architecture courses taken at the 300 level, and have completed an honors thesis (ARCH 499) deemed to be of distinguished quality by the history of architecture faculty.

Dual Degree Options

Students can earn both the B.S. and B.Arch. degrees either simultaneously or sequentially. Students who have transferred into the B.Arch. program at Cornell may find this to be a special opportunity for an enlarged and enriched program of study.

Students currently enrolled in the College of Arts and Sciences at Cornell can earn a B.A. in an arts college major and a B.S. in the history of architecture in five years. In this option, students complete a minimum of 150 credits, which includes the B.S. prerequisites and curriculum requirements and 100 credits of the usual distribution and major requirements in the College of Arts and Sciences. Further information about this option is available at the Admissions Office, B-1 West Sibley Hall, and at the Academic Advising Center of the College of Arts and Sciences, 55 Goldwin Smith Hall.

Students may also elect to continue toward a Master of Arts degree in the history of architecture. The M.A. ordinarily requires a minimum of two years of graduate work beyond the bachelor's degree; with this special sequential degree arrangement that time is shortened to one year.

Summer Term in Architecture

The summer term offers students the opportunity of a concentrated period of design work; the term is six to eight weeks in duration.

Undergraduate design sequence courses, excluding 101 and 502, are offered in Ithaca. Normally there is also a design program abroad for third-, fourth-, and fifth-year students.

Students from schools of architecture other than Cornell are welcome to apply to enroll in any summer program.

Other department courses may be offered as elective courses, contingent upon student interest, faculty availability, and departmental approval.

The department offers a Career Explorations in Architecture Program for high school students and college students considering a professional education in architecture.

Concentration In Architecture For Non-Majors

A special concentration has been formulated specifically for those students not enrolled in the Department of Architecture but who are interested in complementing their current academic program with an introduction to various facets of architectural studies. Some students may wish to use the Concentration in Architecture for Non-Majors as a means of investigating possible graduate studies in architecture. Some may wish to develop architectural specialties within other disciplines. Students are admitted to this program through application to the Department of Architecture.

The curriculum for students accepted to the Concentration in Architecture Program totals 15 credit hours. Grades received must be C or better in all courses.

9 credits of required courses, including one semester each of:

ARCH 130, 131, or 132: Introduction to Architecture	3 credits
ARCH 151: Drawing I	2 credits
ARCH 111: Concentration in Architecture: Design Studio	4 credits

(ARCH 110: Introduction to Architecture: Design Studio, offered in the summer only, may substitute for ARCH 111.)

And 6 credits of elective department courses, chosen, for example from among the following:

ARCH 130, 131, 132: Introduction to Architecture	3 credits
ARCH 152: Drawing II	2 credits
ARCH 181, 182: History of Architecture I, II	3 credits each
ARCH 342: Architecture as a Cultural System	3 credits
ARCH 231, 232: Architectural Analysis I, II	2 credits each
ARCH 263, 264, 363: Structures	3 credits each
ARCH 261, 361, 362: Environmental Controls	3 credits each
ARCH 262: Building Technology	3 credits
ARCH 476: Computer Applications	3 credits

Architectural Design

Courses in brackets are not offered this year.

Each student in the architecture program (undergraduate, graduate, and in the Rome Program) is charged a fee each semester to help defray the continuing costs of refurnishing and replacing equipment.

Sequence Courses

ARCH 101 Design I
Fall. 6 credits. Limited to department students.
An introduction to design as a conceptual discipline directed at the analysis, interpreta-

tion, synthesis, and transformation of the physical environment. Exercises are aimed at developing an understanding of the issues, elements, and processes of environmental design.

ARCH 102 Design II
Spring. 6 credits. Limited to department students. Prerequisite: ARCH 101 and ARCH 151. A continuation of ARCH 101.
Human, social, technical, and aesthetic factors related to space and form. Design problems range from those of the immediate environment of the individual to that of small social groups.

ARCH 201–202 Design III and IV
Fall and spring. 6 credits each term. Coregistration in ARCH 231–232 and completion of ARCH 151–152 required. Limited to department students. Prerequisite for ARCH 201 is ARCH 102 and ARCH 152. Prerequisite for ARCH 202 is ARCH 201.

ARCH 301–302 Design V and VI
Fall and spring. 6 credits each term. Limited to department students. Prerequisite for ARCH 301 is ARCH 202. Prerequisite for ARCH 302 is ARCH 301.

ARCH 401–402 Design VII and VIII
Fall and spring. 6 credits each term. Limited to department students. Prerequisite for ARCH 401 is ARCH 302. Prerequisite for ARCH 402 is ARCH 401 or ARCH 309.
Programs in architectural design, urban design, or architectural technology and environmental science, and other topics.

ARCH 501 Design IX
Fall or spring. 6 credits. Limited to department students. Prerequisite: ARCH 402.
Programs in architectural design, building typology investigations, and research leading to complete development of the student's thesis program. General instruction in the definition, programming, and development of a thesis.

ARCH 502 Design X—Thesis
Fall or spring. 8 credits. Prerequisite: ARCH 501 or ARCH 500 and ARCH 510. Required of B.Arch. candidates who must satisfactorily complete a thesis. Students accepted for admission to the Overlap Program are exempt from the thesis requirement.

ARCH 601–602 Special Program in Architectural Design
Fall and spring. 9 credits each term. Limited to students who have been accepted into the Overlap Program. Registration by petition only.

ARCH 603–604 Special Program in Urban Design
Fall and spring. 9 credits each term. Limited to students who have been accepted into the Overlap Program. Registration by petition only.

Graduate Courses

ARCH 701–702 Problems in Architectural Design
Fall and spring. 9 credits each term.
Basic first-year design course for graduate students whose major concentration is architectural design.

ARCH 703–704 Problems in Urban Design
Fall and spring. 9 credits each term.
Basic first-year design course for graduate students whose major concentration is urban design.

ARCH 801 Thesis or Research in Architectural Design
Fall or spring. 9 credits. Prerequisite: ARCH 701 and ARCH 702.
Second-year design course for graduate students whose major concentration is architectural design.

ARCH 802 Thesis or Research in Urban Design
Fall or spring. 9 credits. Prerequisite: ARCH 703 and ARCH 704.
Second-year design course for graduate students whose major concentration is urban design.

Elective Design Courses

ARCH 103–104 Elective Design Studio
103, fall; 104, spring. 6 credits each term. Limited to students from outside the department. Prerequisite for ARCH 103: permission of instructor required. Prerequisite for ARCH 104: ARCH 103 and permission of instructor.

ARCH 200, 300, 400 Elective Design Studio
Fall or spring. 6 credits. This course is for students who are not architecture majors at Cornell. Prerequisite: permission of department office. Each student is assigned to a class of appropriate level.

ARCH 309 Elective Design Studio
Fall, spring, or summer. 6 credits. Foreign summer and Rome Programs only. Prerequisite: C or better in ARCH 202.
ARCH 309 is a design studio that, upon completion, will be credited as an elective design studio. With the successful completion of ARCH 302, ARCH 309 may be used as a substitute for ARCH 401.

ARCH 500 Design IX Alternate Studio
Fall, spring, or summer. 6 credits. Foreign summer and Rome Programs only. Prerequisite: C or better in ARCH 402. Corequisite: ARCH 510. ARCH 500 will be considered equivalent to ARCH 501 when taken concurrently with ARCH 510. In order to take ARCH 502, one must have a grade of C or better in ARCH 500 and a passing grade in ARCH 510.
For description, see ARCH 401–402.

Related Courses and Seminars

ARCH 110 Introduction to Architecture: Design Studio
Summer. 3 credits. S-U option. Open to nonarchitectural majors in college, high school students in 11th and 12th grades, and any individuals with a minimum of a high school diploma interested in exploring the field of architecture. Not offered every year.
A course designed to introduce students to ideas, principles, and methods of solving architectural problems in a studio setting. Through a graduated sequence of exercises culminating in a major term project, students explore the architectural concepts of space, form, function, and technology. Instruction is via highly personalized critiques of individual student work by assigned department faculty, as well as periodic reviews of the group by invited faculty and guest critics. The course grade is based on the overall performance in the studio with special emphasis on the quality of a major studio project.

ARCH 111 Concentration in Architecture: Design Studio
Spring. 4 credits. Not open to architecture majors. Prerequisite: acceptance into the Concentration in Architecture Program.
A course designed to introduce students to ideas, principles, and methods of solving architectural problems in a studio setting. Through a graduated sequence of exercises culminating in a major term project, students explore the interrelationship of the architectural concepts of space, form, function, and technology. Instruction includes critiques of individual student work by department faculty, as well as, by periodic reviews by guest critics.

ARCH 303 Special Problems in Architectural Design
Fall or spring. Variable credit (maximum 3). Prerequisite: permission of instructor and approved independent study form.
Independent study. This course does not count for design sequence credit.

ARCH 317 Contemporary Italian Culture
Fall or spring. Variable credit (maximum 3). For students in the Rome Program only.
This course provides a broad view of the culture and social structure of Italy, drawing from Italian literature, history, and current events.

ARCH 411 Professional Practice
Fall or spring. 3 credits.
An examination of organizational and management theories and practices for delivering professional design services. Included is a historic overview of the profession and a review of the architect's responsibilities from the precontract phase through construction. Application of computer technology in preparing specifications.

ARCH 412 Professional Seminar
Fall or spring. 3 credits. Prerequisite: ARCH 411.
Visits to public and private agencies and architectural firms. Discussions relative to the various aspects of each firm's practice and the identification of agency roles.

ARCH 510 Thesis Introduction
Foreign summer programs and Rome program only. 3 credits. Must be taken in conjunction with ARCH 500. Prerequisite for ARCH 500 is ARCH 402. ARCH 500 will be considered equivalent to ARCH 501 when taken concurrently with ARCH 510 during a foreign summer program or in Rome.
Lectures, seminars, and independent research leading to complete development of the student's thesis program. General instruction in the definition, programming, and development of a thesis.

ARCH 605 Special Problems in Design
Fall and spring. Variable credit (maximum 3). Prerequisite: permission of instructor.
Independent study. This course does not count for design sequence credit.

ARCH 610 Graduate Design Seminar
Fall. 3 credits. Intended for, but not limited to, graduate students in the Architectural Design and Urban Design Program.
Issues in architectural and urban design.

ARCH 611–612 Urban Housing Developments
611, fall; 612, spring. 3 credits each term. Limited to fourth- and fifth-year students in architecture and graduate students. Prerequisite: permission of instructor. Not offered every year.

ARCH 613 Transportation
Fall. 3 credits. Prerequisite: permission of instructor. Not offered every year.
The affect of various transportation forms on the environment is considered from the perspectives of architects, engineers, planners, and human ecologists. Readings and discussions of past, current, and future transportation modes focus on aesthetic and physical aspects.

ARCH 614 Low-Cost Housing
Spring. 3 credits. Prerequisite: permission of instructor. Not offered every year.
Aspects of low-cost housing involving engineering technology, architecture, physical planning, economics, and sociology.

ARCH 618–619 Seminar in Urban and Regional Design
618, fall; 619, spring. 3 credits each term. Limited to fifth-year and graduate students. Not offered every year.
A broad range of issues and problems of urban and regional development and the context in which the designer functions are surveyed. Selected case studies are presented by participants and visitors.

Architectural Theory

ARCH 130 An Introduction to Architecture: Lectures
Summer. 3 credits. S-U option. Open to nonarchitecture majors in college, high school students in 11th and 12th grades, and any individuals with a minimum of a high school diploma interested in exploring the field of architecture. Not offered every year.
A survey course that covers the many facets of architecture: history, design principles, preservations, landscape architecture, building technology, and cultural factors. The format of the course comprises lectures, demonstrations, films, and field trips. Course evaluation is based on quizzes and a final examination.

ARCH 131 An Introduction to Architecture
Fall. 3 credits. Open to out-of-department students only. ARCH 131 is not a prerequisite for ARCH 132.
Intended to familiarize nonarchitecture students with the art and science of architecture. The fundamentals of plan, section, and elevation, the primary elements that comprise an architectural form; basic organizational principles; the ways in which we perceive architectural space; and the various concepts of function in relation to form will be included among the topics to be covered, using examples from numerous times and cultures as well as from the contemporary Cornell campus.

ARCH 132 An Introduction to Architecture
Spring. 3 credits. Open to out-of-department students only. ARCH 131 is not a prerequisite for ARCH 132.
Nonarchitecture students are initiated into various types of architectural drawings and are exposed to a variety of methods whereby architectural forms communicate both simple and complex meanings. Architecture in its relation to fields such as landscape architecture, urban design, structural design, interior design, set design, architectural history, preservation, and computer graphics will be included in the presentations, which also deal with the various relationships established between an architect and a society. Cross-historical and cross-cultural examples will be used in developing in the student a degree of fluency in the languages of architectural discourse.

ARCH 231 Architectural Analysis I
Fall. 2 credits. Architecture students must register concurrently in ARCH 201.
An introduction to analysis of the object of study in the interest of broadening one's understandings of the ways in which architecture can connote and denote meanings.

ARCH 232 Architectural Analysis II
Spring. 2 credits. Architecture students must register for this course concurrently with ARCH 202.
Advanced analytical studies focusing on complex architectural spaces, objects, images, and representations.

ARCH 334 Column, Wall, Elevation, Facade: A Study of the Vertical Surface in Architecture (also ARCH 634)
Fall or spring. 3 credits. Limited to third-year level students and above.
Field and figure relationships (interrelation of parts dominated by the general character of the whole) are the general themes for studying numerous issues relevant to the design of elevations and facades.

The first part of the seminar is a lecture/seminar format. Students are required to research and present a paper for discussion. In the latter part of the semester, students do exercises to demonstrate their understanding of the issues addressed.

ARCH 335 Theory of Architecture
Fall or spring. 3 credits. Prerequisite: ARCH 231–232 or permission of instructor. Not offered every year.

ARCH 336 Theory of Architecture
Fall or spring. 3 credits. Limited to third-year students and above. Not offered every year.
Theories of modern architecture: De Stijl, cubist and purist painting, industrialized architecture, Le Corbusier's architecture and urban theories, architectural sequence, facades, the free plan, and "DOMINO" theory.

ARCH 337 Special Investigations in the Theory of Architecture I
Fall or spring. Variable credit (maximum 3). Prerequisite: permission of instructor and approved independent study form.
Independent study.

ARCH 338 Special Topics in the Theory of Architecture I
Fall or spring. 3 credits. Prerequisite: permission of instructor. Not offered every year.
Topic are announced before preregistration.

ARCH 339 Elements, Principles, and Theories in Japanese Architecture
Spring. 3 credits. Not offered every year.
An examination of Japanese architecture (buildings and gardens) and their contexts: landscapes, settlements, and cities. The course is addressed to those interested in Japanese architecture as a manifestation of Japanese culture and as a subject for analysis. Emphasis is on underlying concepts, ordering principles, formal typologies, space and its representation, perceptual phenomena, and symbolic content. Readings focus on theoretical treatments of these aspects by Japanese and western writers.

ARCH 431 Theory of Architecture
Fall. 3 credits. Prerequisite: third-year status. Not offered every year.
Gardening and architecture; urban parks; villas and country houses; and Italian, French, and English landscape gardens. Site planning.

ARCH 432 Theory of Architecture
Spring. 3 credits. Prerequisite: third-year status. Not offered every year.
The development of urban form, urban intervention, contextualism, ideal cities, historic new towns, streets, piazzas, fortifications, public buildings and social housing types, site planning, and transportation.

ARCH 435 Architecture and Representation
Fall. 3 credits. Limited to degree candidates in architecture. Prerequisite: successful completion of ARCH 231–232. Not offered every year.
A study of architecture as it functions as a representational art, referring to its past while inferring its present.

ARCH 634 Column, Wall, Elevation, Facade: A Study of the Vertical Surface in Architecture (also ARCH 334)
Fall or spring. 3 credits. Limited to third-year level students and above.
For description, see ARCH 334.

ARCH 635 Critical Theory in Architecture
Spring. 3 credits. Prerequisite: permission of instructor. Not offered every year.
An inquiry into the fundamental principles of architectural criticism in theory and practice, with emphasis on the structures of criticism in the twentieth century.

ARCH 637 Special Investigations in the Theory of Architecture II
Fall or spring. Variable credit (maximum 4). Prerequisite: permission of instructor and approved independent study form.
Independent study.

ARCH 638 Special Topics in the Theory of Architecture II
Fall or spring. 3 credits. Prerequisite: permission of instructor. Not offered every year.
Topic is announced before preregistration.

Architecture, Culture, and Society

ARCH 342 Architecture as a Cultural System
Spring. 3 credits. ARCH 445, 446, 447, or 448 can substitute with permission of instructor.
What have been the major issues in the theory and practice of architectural design through time and across cultures, and how is aesthetic judgment related to more general systems of ordering within a particular society or group? This course draws on concepts, methods, and findings from the broad field of cultural

anthropology to address these questions. Case studies and examples are drawn from a wide range of architectural traditions around the world for which there is significant ethnographic literature, with special emphasis on sub-Saharan Africa, India, and the United States. Topics include the ideational and formal relationships between folk and monumental traditions in complex societies; the structure of the ideal social order and its refraction in the material world; cosmological models and architectural form; geometries of non-Western traditions; and the relationship between indigenization and culture change.

ARCH 349 Undergraduate Investigations in Architecture, Culture, and Society
Fall or spring. Variable credit (maximum 3). Prerequisite: permission of instructor and approved independent study form.
Independent study.

ARCH 441–442 Special Topics in Architecture, Culture, and Society
Fall and spring. 3 credits each term. Prerequisite: permission of instructor.
Topic to be announced before preregistration.

ARCH 445 Architecture and the Mythic Imagination
Fall. 3 credits. Prerequisite: ARCH 342 or permission of instructor. Not offered every year.
This course focuses on traditional societies in which beliefs about architectural order are borne out of the mythic and religious imagination. Certain themes that are common to a range of cultures are explored in detail. They include the model of the human body as a source of architectural knowledge, the sacred center, the cosmic mountain, and architectural rituals as enactments of myths. Such themes are traced across cultures, through time, and into contemporary theory.

ARCH 446 Topics in Architecture, Culture, and Society
Fall or spring. 3 credits. Prerequisite: ARCH 342 or permission of instructor.

ARCH 447 Architectural Design and the Utopian Tradition
Fall. 3 credits. Prerequisite: ARCH 342 or permission of instructor. Not offered every year.
This course explores the relationship between visionary architecture of the late 19th and 20th centuries and the wider utopian literature of the time. It first explores themes in utopian fiction as well as in anti-utopian tracts and then turns to the attempts of architects, planners, and artists to concretize visions of the ideal world. The course will devote special attention to the ways in which ideals grounded in the utopian tradition have emerged in the social criticism of housing and neighborhood design in the urban setting in recent times.

ARCH 448 The Indian Example and the Visual Tradition in Culture
Spring. 3 credits. Prerequisite: ARCH 342 or permission of instructor. Not offered every year.
This course provides a concise chronological summary of the major building traditions of Hindu India and explores the relationship between form and more general beliefs about the power of vision to reveal and transform. Topics include the sculptural program of the Hindu temple as a vehicle for the preservation and transmission of mythic texts, the oculus as an element and the eye as a motif, darshan, the spiritually transforming vision, and the destructive power of vision as revealed in myth and beliefs about "evil eye."

ARCH 647–648 Architecture in Its Cultural Context I and II
647, fall; 648, spring. 4 credits each term. Prerequisite: permission of instructor. Not offered every year.
Fall term, theory; spring term, problem solving and method. An examination of the relationship between architecture and other aspects of culture. Emphasis on the motivations for particular architectural forms and especially on theories of architecture. Examples from the United States and Asia.

ARCH 649 Graduate Investigations in Architecture, Culture, and Society
Fall or spring. Variable credit (maximum 4). Prerequisite: permission of instructor and approved independent study form.
Independent study.

Visual Studies

Darkroom fees are charged for all photography courses.

ARCH 151 Drawing I
Fall. 2 credits.
Freehand drawing with emphasis on line and perspective representation of form and space.

ARCH 152 Drawing II
Spring. 2 credits. Prerequisite: ARCH 151.
Freehand drawing as a means of conceiving and expressing spatial form; line weight, shades and shadows, and figure drawing.

ARCH 251 Introductory Photo I (also ART 161)
Fall, spring or summer. 3 credits.
For description see ART 161.

ARCH 351 Photography II (also ART 261)
Fall, spring or summer. 4 credits. Prerequisite: ARCH 251 or ART 161, or permission of instructor.
For description see ART 261.

ARCH 450 Architectural Publications
Fall and spring. Variable credit (maximum 3). May be repeated for credit.
Colloquy and practicum on issues related to the production of an architectural journal, as well as other theoretical and practical production issues related to the exchange of architectural ideas. Exercises cover both theoretical as well as hands-on aspects of architectural publication.

ARCH 457 Special Project in Photography
Fall or spring. Variable credit (maximum 3). Prerequisites: written proposal outlining the special project and permission of instructor. Not offered every year.
Independent study.

ARCH 458 Special Investigations in Visual Studies
Fall or spring. Variable credit (maximum 3). Prerequisites: permission of instructor and approved independent study form.
Independent study.

ARCH 459 Special Topics in Visual Studies I
Fall or spring. 3 credits. Prerequisite: permission of instructor.
Topics announced before preregistration.

ARCH 658 Special Investigations in Visual Studies II
Fall or spring. Variable credit (maximum 4). Prerequisites: permission of instructor and approved independent study form.
Independent study.

ARCH 659 Special Topics in Visual Studies II
Fall or spring. 3 credits. Prerequisite: permission of instructor.
Topics announced before preregistration.

Architectural Science and Technology

Structures

ARCH 263 Structural Concepts
Fall. 4 credits. Prerequisite: Mathematics 111 or approved equivalent.
Fundamental concepts of structural behavior. Statics and strength of materials. Introduction to and analysis of simple structural systems.

ARCH 264 Structural Elements
Spring. 3 credits. Prerequisite: ARCH 263.
Concepts and procedures for the design of individual structural components (columns, beams, etc.) in steel, concrete, and timber construction.

ARCH 363 Structural Systems
Fall or spring. 3 credits. Prerequisite: ARCH 264.
Concepts and procedures for the design of overall structural framing systems in steel, concrete, and timber construction.

ARCH 364 Vertigo Structures (also ARCH 664)
Fall or spring. 3 credits. Prerequisite: ARCH 363 or equivalent. Limited enrollment. Not offered every year.
A course in which students examine and experiment with the design of tall vertical structures, principally in terms of overall structural form and behavior, but also in the context of aesthetic, perceptual, historic, economic, and social considerations. Weekly meetings include lectures, discussion seminars, and studio-type design reviews.

ARCH 365 Bridge Design (also ARCH 665)
Fall or spring. 3 credits. Prerequisite: ARCH 363 or equivalent. Limited enrollment. Not offered every year.
There can be no denying the major visual impact of bridges on the built environment. And yet, during the past century, architects have virtually abandoned the role that they have historically had in the design of these structures. Engineers, on the other hand, have claimed bridge design as their responsibility and have hailed it as evidence of Structural Art. Are the basic principles of bridge design such that this situation makes sense for our society? Or is a rethinking of the manner in which bridges are designed called for? Students in this course examine and experiment with the design of bridge structural forms, not only in terms of what is technically feasible but also, with equal emphasis, in the context of aesthetic, historical, and social considerations. Weekly meetings include lectures, discussion seminars, and studio-type design reviews.

ARCH 463 Special Topics in Structures
Fall or spring. 3 credits. Limited to 30 students. Prerequisites: ARCH 263, 264, and 363 or permission of instructor. Not offered every year.
Topics announced before preregistration.

ARCH 473 Special Investigations in Structures
Fall or spring. Variable credit (maximum 3). Prerequisite: permission of instructor and approved independent study form.
Independent study.

ARCH 664 Vertigo Structures (also ARCH 364)
Fall or spring. 3 credits. Prerequisite: ARCH 363 or equivalent. Limited enrollment. Not offered every year.
For description, see ARCH 364.

ARCH 665 Bridge Design (also ARCH 365)
Fall of spring. 3 credits. Prerequisite: ARCH 363 or equivalent. Limited enrollment. Not offered every year.
For description, see ARCH 365.

Construction

ARCH 262 Building Technology, Materials, and Methods
Spring. 3 credits.
Properties of materials—their use and application to the design of buildings and building systems. Discussion of various methods of building construction and assembly.

ARCH 465 Special Topics in Construction
Fall or spring. 3 credits. Limited to 30 students. Prerequisites: ARCH 262 or permission of instructor. Not offered every year.
Topics announced before preregistration.

ARCH 475 Special Investigations in Construction
Fall or spring. Variable credit (maximum 3). Prerequisite: permission of instructor and approved independent study form.
Independent study.

Environmental Controls

ARCH 261 Environmental Controls—Site Planning
Fall. 3 credits.
The basic principles involved in design in the outdoor environment. A brief historical perspective. A development of inventory including grading and drainage. Foundations, surfacing, and construction.

ARCH 361 Environmental Controls—Lighting and Acoustics
Fall. 3 credits.
Basic properties and principles of sound and light. Sound phenomena, noise control, absorption, acoustical design; light, color, and form. Natural lighting possibilities and constraints as well as good and bad examples of artificial lighting.

ARCH 362 Environmental Controls—Mechanical and Passive Solar Systems
Spring. 3 credits.
Basic thermal analysis of buildings, human comfort criteria, energy conservation, passive solar design, HVAC distribution systems, overview of mechanical conveying systems, and plumbing.

ARCH 464 Special Topics in Environmental Controls
Fall or spring. 3 credits. Limited to 30 students. Prerequisites: ARCH 261, 361, and 362 or permission of instructor. Not offered every year.
Topics announced before preregistration.

ARCH 474 Special Investigations in Environmental Controls
Fall or spring. Variable credit (maximum 3). Prerequisite: permission of instructor and approved independent study form.
Independent study.

Computer Applications

ARCH 372 Imaging and the Electronic Age
Spring. 3 credits. For undergraduate, non–computer-scientists. 2 lectures. 1 recitation. Not offered every year. D. Greenberg.
Historical technological advances which created major paradigm shifts for communications as well as advances in computer technology are presented. Technical fundamentals of computer graphics capabilities are emphasized. The latter half of the course covers the effect of these scientific advances on many discipline-specific areas including architecture, art and animation, photography and the film industry, medicine, engineering design, the corporate structure, and education. The course is heavily supplemented with pictorial content consisting of slides, movies, and live interactive demonstrations.

ARCH 374 Computer Graphics and Visualization (also COM S 417)
Spring. 3 credits. Prerequisite: COM S/ ENGRD 211.
For description, see COM S 417.

ARCH 375 Practicum in Computer Graphics (also COM S 418)
Spring. 2 credits. Enrollment limited. Permission of instructor required. Recommended: COM S 314. Corequisite: COM S 417.
For description, see COM S 418.

ARCH 378 Microcomputer Applications in Design
Fall. 3 credits. Prerequisites: previous knowledge of PC-based CAD or permission of instructor.
This course covers advanced principles, concepts, and applications of microcomputer-aided design, synthetic imaging, and animations. It combines seminar-style presentation with hands-on laboratory sessions. The course uses IBM PC platforms exclusively.

ARCH 379 Design by Computer
Spring. 3 credits. Prerequisites: limited to third-year students and above. Not offered every year.
Exploration of the formalization of the design process for compatability with the computer, and the role of computers in design. Lecture with CAD lab.

ARCH 476 Special Topics in Computer Applications
Fall or spring. 3 credits. Limited to 30 students. Prerequisites: ARCH 374 or 379 or permission of instructor. Not offered every year.
Topics announced before preregistration.

ARCH 477–478 Special Projects in Computer Graphics
477, fall; 478, spring. Variable credit (maximum 4). Limited to third-year students and above. Prerequisites: ARCH 374, plus concurrent registration in Computer Science 314 or equivalent, and permission of instructor.
Advanced work in computer graphics input and display techniques, including storage tube, dynamic vector, and color raster displays.

ARCH 479 Micro-Computer Applications in Design (also ARCH 679)
Fall. 3 credits. Prerequisites: an introductory course in computer graphics or computer science, or permission of instructor; upper level undergraduate or graduate status.
The course explores the role of synthetic imaging and computer graphics in architectural design. The first half of the course is devoted to examining the new possibilities that information technologies offer for multimedia visualization of architecture, from abstract conceptual drawings, to sketching, photorealistic rendering, and multimodal representation, including motion and sound. The second part of the course explores the uses of information technologies to model and simulate the creative design process. These explorations include: developing a library of design ideas as building blocks for design; creating multimodal, multidimensional, immersive, virtual environments; interactive transformation and synthesis of design concepts; and "reverse architecturing" of canonical works. The emphasis of this course is on concepts as well as methods and techniques of computer graphics and their application to simulating the creative design process in architecture.

Graduate Courses

ARCH 679 Micro-Computer Applications in Design (also ARCH 479)
Fall. 3 credits. Prerequisite: an introductory course in computer graphics or computer science, or permission of instructor; upper level undergraduate or graduate studies.
For description, see ARCH 479.

ARCH 761–762 Architectural Science Laboratory
761, fall; 762, spring. 6 credits each term. Open to architectural science graduate students only.
Projects, exercises, and research in the architectural sciences.

ARCH 763–764 Thesis or Research in Architectural Science
763, fall; 764, spring. Variable credit (maximum 12). Limited to architectural science graduate students.
Independent study.

Architectural History

The history of the built domain is an integral part of all aspects of the architecture curriculum, from design and theory to science and technology. Incoming students take ARCH 181–182 in the first year, and three additional courses from the 380–399 series, preferably in the third and fourth years. Seminars are intended for advanced undergraduate and graduate students and do not satisfy undergraduate history requirements. Courses with the same number may only be taken once to

satisfy history of architecture or in-college requirements.

Sequence Courses

ARCH 181 History of Architecture I
Fall. 3 credits. Required of all first-year students in architecture; open to all students in other colleges with an interest in the history of the built domain.
The history of the built environment as social and cultural expression from the earliest to more recent times. Themes, theories, and ideas in architecture and urban design are explored, beginning with the earliest written records.

ARCH 182 History of Architecture II
Spring. 3 credits. Required of all first-year students in architecture. Open to all students in other colleges with an interest in the history of the built domain; may be taken independently of ARCH 181.
The history of the built environment as social and cultural expression from more recent times to the present. Architecture and urban design themes, theories, and ideas are addressed in greater detail leading to the present time.

Directed Electives

ARCH 380 History of Theory
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
This course, in which classroom discussion and debate play a central role, explores the history of important theoretical issues involving art and architecture. The readings, which span from the Greeks to today, focus on more than just questions of aesthetics and include theories of ethics, origins, imagination, nature, society, and pedagogy.

ARCH 381 From Eutopia to the Ghetto: Renaissance Urban Form
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
Significant developments in European urban design from 1300–1600. Particular attention will be awarded to Italy and Spain. The course focuses on a series of case studies: entire towns, specific urban spaces, and individual building types. Weekly discussions contextualize the city within a larger cultural framework. We will consider how civic, economic, social, political, legislative, technical, and material concerns have had a significant impact on the form, function, and patronage of these places, spaces, and structures. The relevance of Renaissance theory to contemporary practice is also emphasized through the discussion of several twentieth-century urban plans and built projects.

ARCH 382 Architecture in the Middle Ages (also ART H 332 and RELST 332)
Fall. 4 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
For description, see ART H 332.

ARCH 383 The Construction of Modern Life: The Politics of Memory and the Commodification of Architecture
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
This course examines the complex relationship between the built environment, the construction and definition of cultural heritage, collective memory and civic identity, and the commodification or commercial celebration of specific buildings, sites, and urban events. We focus on late eighteenth-, nineteenth-, and twentieth-century Europe. Particular attention is awarded to the discourse surrounding the restoration of buildings (and figures such as Ruskin, Viollet-le-Duc, and Giovannoni); political agendas guiding restoration and urban renewal projects; newly defined venues of modern urban spectacle (such as the world's fair, department stores, morgues, and panoramas); and the role played by tourism in the commodification of local and foreign sites.

ARCH 384 The Urban Landscape of Renaissance Rome: 1450–1600
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
This class is an exploration into the urban morphology, architecture, and civic life of Renaissance Rome. The city was a thriving center for architectural practice. It drew practitioners from throughout the peninsula and served as an important theoretical model for architects elsewhere. We survey the important issues, individuals, and building projects of the city between 1450 and 1600 with particular emphasis on the intellectual and physical rediscovery and re-appropriation of Antiquity; the role of the Vatican with its large population of pilgrims, tourists, resident church officials, foreign bankers, and dignitaries that made specific demands of the built environment; and the unique topography and natural resources of the city's location. The last portion of the course addresses the legacy of the Renaissance during the period of Italian unification and the Fascist regime.

ARCH 385 Magnificent Utility—Architecture and the Arts of Persuasion
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
Architects put revolutionary attitudes about form, space, light, and the arts into practice during the course of the seventeenth century. Focusing on the urban centers of Rome and Paris and the cultural landscapes of Spain, England, and Central Europe, this course explores how architecture, urban design, and the arts were employed to promote state and church.

ARCH 387 The Nineteenth Century—Style, Technology, and Individuality in the West
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
An examination of the nineteenth-century efforts to create appropriate stylistic forms and expressions for emerging building technologies and typologies. The preservation of individual artistic expression against the backdrop of industrialization, urbanization, and professionalization is emphasized. The course begins with Rationalist theory and its architectural expression and concludes with considerations of Art Nouveau, Modernismo, and Jugendstil.

ARCH 388 Modernism
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
Precursors and proponents of the modern movement from the late nineteenth century into the 1940s are considered in this course. The cultural intents of the modern are examined in architectural and urban design for individuals, groups, and institutions, from Mies van der Rohe, Le Corbusier, and Frank Lloyd Wright to de Stijl, the Bauhaus, and design education. Attention is paid to the politics of design in serving the state during the 1930s.

ARCH 389 Architecture, Revolution, and Tradition
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
From early eighteenth to early nineteenth century, European society underwent profound change. Political absolutism—the doctrine of unlimited governmental control—was challenged; Enlightenment attitudes—commitments to human reason, science, and education—gained ascendancy. This course considers architectural and urban design in these times of tumult. It begins with efforts to foment architectural revolution within inherited traditions and ends with attempts to establish design traditions within revolutionary settings.

ARCH 390 American Architecture and Building I
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
A review of architecture, building, and responses to the landscape from the prehistoric period to the Civil War. Architecture and building as social and collaborative arts are emphasized and thus the contributions of artisans, clients, and users as well as professional architects and builders are examined. The architectural expressions of Native Americans, African Americans, women, and others are treated in addition to those of European colonists and settlers.

ARCH 391 American Architecture and Building II
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
A continuation of Architecture 390 but may be taken independently. An account of American architecture, building, and responses to the environment from the post–Civil War period to the present day. Particular attention is paid to the processes of industrialization, professionalization, and urbanization as well as to the manifestations of gender, class, race, and ethnicity in the built and architectural environments.

ARCH 392 Modern Architecture on Film
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
An exploration of certain themes deemed critical to modern architecture and urbanism through their representation in both commercial and avant-garde films from the medium's birth until the present day. The focus varies each semester with particular emphases to include the modern house and housing, the modern city, technology and visions of the future, and finally the image of the architect. Representations of these themes in other forms such as painting, photography, theatre, literature, and advertising also are examined. The course includes selected readings in modern architecture and film, screenings in

class, class discussions, presentations, and papers.

ARCH 393 The Cumulative City
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
Well-established cities were transformed by radical and unimagined change in the nineteenth and twentieth centuries. Politics and economies were recast, populations exploded, and new technologies reshaped transportation, communication, and building. This course explores transformation historically in the cumulative city, focusing on specific cities in America and Europe, Africa and Asia. The cultural context of each city is examined to understand how it changed and how meanings became associated with evolving urban forms.

ARCH 394 Toward the Millennium
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
Theory and practice in architecture and urbanism are investigated from the 1950s to the present. From the Americanized International Style to the recent internationalism of design attitudes, the immediate past is explored historically to probe the matrix of meanings associated with contemporary form, urbanism, and technology.

ARCH 396 Special Topics in the History of Architecture and Urbanism
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
Topics to be announced.

ARCH 397 Special Topics in the History of Architecture and Urbanism
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
Topics to be announced.

ARCH 398 Special Topics in the History of Architecture and Urbanism
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
Topics to be announced.

ARCH 399 Special Topics in the History of Architecture and Urbanism
Fall or spring. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered every year.
Topics to be announced.

Courses in Preservation

ARCH 583 Measured Drawing (also CRP 567)
Fall. 3 credits. For undergraduate architecture students and graduate students in history and preservation. Prerequisite: permission of instructor.
For description, see CRP 567.

ARCH 584 Problems in Contemporary Preservation Practice (also CRP 563)
Spring. Variable credit.
For description, see CRP 563.

ARCH 585 Perspectives on Preservation (also CRP 562)
Fall. 3 credits.
For description, see CRP 562.

ARCH 586 Documentation for Preservation (also CRP 560)
Fall or spring. 3 credits.
For description, see CRP 560.

ARCH 587 Building Materials Conservation (also CRP 564)
Spring. 3 credits. Open to juniors, seniors, and graduate students.
For description, see CRP 564.

ARCH 588 Historic Preservation Planning Workshop: Surveys and Analyses (also CRP 561)
Fall or spring. 4 credits.
For description, see CRP 561.

Graduate Seminars in the History of Architecture and Urbanism

All topics for ARCH 682 to ARCH 699 will be announced prior to the start of the semester.

ARCH 680 Seminar in Historiography
Fall. 4 credits. Prerequisite: permission of instructor.
Historiographic and methodological issues are examined in relation to the history of architecture and urbanism. Taught by different faculty members in successive years, the seminar is required of all first- and second-year graduate students in the History of Architecture and Urbanism Program.

ARCH 682 Seminar in Urban History
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

ARCH 683 Seminar in the History of Theory
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

ARCH 684 Seminar in the Italian Renaissance: Architecture, Politics, and Urbanism
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

ARCH 686 Seminar in Seventeenth- and Eighteenth-Century Architecture and Urbanism
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

ARCH 688 Seminar in Twentieth-Century Architecture and Urbanism
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

ARCH 689 Seminar in the History of Cities
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

ARCH 690 Seminar in American Architecture, Building, and Urbanism
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

ARCH 692 Seminar in Nineteenth-Century Architecture, Building, and Urbanism
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

ARCH 696 Seminar in Special Topics in the History of Architecture and Urbanism
Fall or spring. 4 credits. Prerequisites: permission of instructor. Not offered every year.

ARCH 697 Seminar in Special Topics in the History of Architecture and Urbanism
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

ARCH 698 Seminar in Special Topics in the History of Architecture and Urbanism
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

ARCH 699 Seminar in Special Topics in the History of Architecture and Urbanism
Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

Independent Study, Thesis, Dissertation

ARCH 299 Undergraduate Independent Study in the History of Architecture and Urbanism
Fall or spring. Variable credit (maximum 3). Prerequisite: permission of instructor. May not be taken by students in design to satisfy undergraduate history requirements.
Independent study for undergraduate students.

ARCH 499 Undergraduate Thesis in the History of Architecture and Urbanism
Fall or spring. 4 credits. For B.S. honors candidates in history only.

ARCH 799 Graduate Independent Study in the History of Architecture and Urbanism
Fall or spring. Variable credit (maximum 12). Prerequisite: permission of instructor.
Independent study for graduate students only.

ARCH 899 M.A. Essay in the History of Architecture and Urbanism
Fall or spring. 4 credits.
Independent preparation of the M.A. essay, often developed from topics investigated in ARCH 680.

ARCH 999 Ph.D. Dissertation in the History of Architecture and Urbanism
Fall or spring. Variable credit (maximum 12).
Independent study for the doctoral degree.

ART

Buzz Spector, chair; Z. Blum, V. G. Kord, J. N. Locey, M. Lyons, T. McGrain, E. Meyer, G. Page, director of graduate studies; B. Perlus, J. L. Squier, W. S. Taft, K. WalkingStick, and visiting critics.

Undergraduate Program

The curriculum in art is a program of study within the College of Architecture, Art, and Planning, as well as other colleges at Cornell.

The undergraduate curriculum in art is an excellent background for a career in the visual arts. Past graduates have found it to be an

excellent preparation for a career in applied art, although no specific technical courses are offered in such areas as interior design, fashion, or commercial art.

The undergraduate curriculum in art, leading to the degree of Bachelor of Fine Arts, provides an opportunity for the student to combine a general liberal education with the studio concentration required for a professional degree. During the first four semesters, all students follow a common course of study designed to provide a broad introduction to the arts and a basis for the intensive studio experience of the last two years. Beginning with the third year, students concentrate in painting, sculpture, photography, printmaking, or combined media.

Studio courses occupy approximately one-half of the student's time during the four years at Cornell; the remaining time is devoted to a diversified program of academic subjects with a generous provision for electives.

All members of the faculty in the Department of Art are practicing, exhibiting artists, whose work represents a broad range of expression.

A candidate for the B.F.A. degree may also earn a Bachelor of Arts degree from the College of Arts and Sciences or the College of Human Ecology, in a five-year dual degree program. This decision should be made early in the candidate's career (no later than the third semester) so that he or she can apply to be registered in both colleges simultaneously. Each student is assigned an adviser in both colleges of their dual degree program to provide needed guidance. A candidate for two degrees must satisfy all requirements for both degrees. At least 62 of the total credits must come from courses offered in the Department of Art. In addition, all Department of Art requirements for freshman writing seminars, art history, and distribution must be met.

It is expected that a dual degree candidate will complete the pre-thesis and thesis requirements for the B.F.A. degree during either their fourth or fifth year.

Bachelor of Fine Arts Degree Requirements

Credits and Distribution

130 credits are required for the B.F.A. degree. A minimum of 62 are taken in the Department of Art. A minimum of 57 are taken outside the department.

Curriculum

Students are expected to take an average course load of 16 credits per semester during their four years. If a student wishes to take more than three studio courses in any one semester they must file a petition. All students must take at least one studio course a semester unless there are exceptional circumstances expressed in the form of a petition. **Any request to deviate from the standard curriculum must be petitioned to the department prior to the act.**

Specific Course Requirements

By the end of the second year, students must have completed an introductory course in each of the areas of painting, sculpture, printmaking, photography, and four drawing courses. By the end of the third year, all students must have completed an additional 12 credits beyond the introductory level in three of the four areas.

Concentration

Students must plan their programs to complete 27 credits in one of the studio areas of painting, sculpture, photography, or printmaking. Declaration of the area of concentration must be made during the second semester of the sophomore year. B.F.A. students complete a senior thesis in one area of concentration and are required to participate in the Senior Exhibition in the semester the thesis is taken.

Concentration Requirements (27 credits total; 26 in printmaking)

The required courses for each concentration are as follows:

Painting: ART 121, 221, 321, 322, 421, 422 (Thesis)

Sculpture: ART 141, 241, 341, 342, 441, 442 (Thesis)

Printmaking: ART 131/132/133 (2 of 3); 231, 232, 233 (1 of 3); 331, 431, 432 (Thesis)

Photography: ART 161, 261, 263, 461, 462 and one of the following: ART 264, 265, or 361

Dual Concentration

If a student is interested in studying in more than one area, they may choose to do a dual concentration. The dual concentration requires a first area, in which the thesis is conducted, and a non-thesis second area. Pre-thesis and thesis must be taken in the first area of concentration. Students take 23 credits in the first area of concentration and 15 credits in the second area of concentration. Drawing is only available as a second area of concentration.

The required courses for the dual concentration are:

First Area of Concentration	*Total Credits*
Painting: ART 121, 221, 321, 421, 422	23
Sculpture: ART 141, 241, 341, 441, 442	23
Printmaking: ART 131/132/133 (2 of 3) 231/232/233 (1 of 3) 431, 432	22
Photography: ART 161, 261, 263/264/265 (1 of 3), 461, 462	23
Second Area of Concentration	*Total Credits*
Drawing: ART 151, 152, 251, 252, independent study	15
Painting: ART 121, 221, 321, 322	15
Sculpture: ART 141, 241, 341, 342	15
Printmaking: ART 131/132/133 (2 of 3) 231/232/233 (1 of 3); 331	14
Photography: ART 161, 261, 263/264 265 (2 of 3)	15

Note: The total number of out-of-college elective credits required will be adjusted to allow for the additional credits required of the dual concentration.

Combined Media Concentration

The combined media concentration enables students to fulfill concentration requirements by combining several studio disciplines, including out-of-department studio courses such as those offered in the departments of music, theatre, and dance, etc.

Students' must file an approved "**Area of Concentration**" form. In addition to the courses required of all BFA majors during their first and second year (see BFA curriculum), students must take two studios at a 200 level or 300 level, a minimum of 2 'Out of College' studio electives (OCE Studio) of 3–4 credits each, ART 481/Pre-Thesis Combined Media and ART/482 Thesis Combined Media.

Rome Program

Students in good standing who have completed the requirements of the first two years of the curriculum are eligible for participation in the Rome Program. Students are admitted to the program by application and review of their academic record. Applications are submitted to the Rome Program coordinator. Students applying to the Rome Program must meet with their faculty adviser, the Art Department Rome Program adviser, and the department chair to obtain signatures of approval for admission to the program. Students in the department wishing to attend the Rome Program must register for a full semester of credits. The department recommends that students attend the program during the first or second semester of their junior year. (Under special circumstances, seniors may petition to attend the Rome Program.) **Only under special circumstances and with prior petition and approval, are seniors allowed to attend the Rome program.** Students wishing to spend two consecutive semesters in Rome must petition which should include the proposed course schedule for both semesters and must have appropriate faculty approval.

Rome Curriculum

ART 400	Rome Studio Fulfills 4 credits of concentration	4
ART 312*	Modern Art in Italy	3
ART 317	History of Art in Rome: Early Christian to the Baroque Age	4
or		
ART 318	History of Art in Rome: Renaissance in Rome and Florence	4
ITALA 111/112	Italian Language	4
ARCH 317	Contemporary Italian Film	1
	16 Total	

Students may petition to take more than 16 credits per semester in the Rome Program. Students may study in Rome for one or two academic semesters.

*Fulfills 300-level Theory and Criticism requirement.

Out-of-College Requirements

A minimum of 57 electives credits must be taken outside of the college. In the first year, students must take two freshman writing seminars. Students are required to take courses from among three groups, which include: Physical and Biological Sciences (minimum of two courses, of at least 3 credits each); Social Sciences (minimum of three courses, of at least 3 credits each); and, Humanities and Expressive Arts (minimum of three courses, of at least 3 credits each). All B.F.A. students are required to take 20 credits in the History of Art. One course must be taken in each of the following areas:

Modern: 260, 265, 270, 360, 361, 362, 364, 365, 366, 367, 370, 376, 464.

Non-Western: 280, 378, 380, 381, 383, 384, 385, 386, 389, 395, 396.

Three electives: any art history elective at the 300 level or above or any architectural history elective. (Note: course offerings may vary each semester. Students are encouraged to consult with their adviser. Students may petition to substitute courses of similar content.)

The university requirement of two terms in physical education must be met.

A candidate for the B.F.A. degree at Cornell is required to spend the last two terms of candidacy in residence at the university, subject to the conditions of the Cornell faculty legislation of November 14, 1962. No student may study in absentia for more than two terms.

Students who transfer into the undergraduate degree program in art must complete a minimum of four terms in residence at Cornell and a minimum of 60 credits at the university, of which 30 credits must be taken in the Department of Art, including four terms of studio work.

For those students matriculating in fall of 2001:

Students are required to take ART 111, Introductory Art Seminar; ART 121, Introductory Painting; or ART 141, Introductory Sculpture; Art History Elective; and a Freshman Writing Seminar during the fall semester of the freshman year. An Art History Elective, ART 171, Electronic Imaging in Art, and an additional Freshman Writing Seminar must be taken during the spring semester of the freshman year. A 300-level course in Theory and Criticism must be taken sometime during the junior or senior year.

Courses that will fulfill Theory and Criticism requirement (note: offerings may change from year to year. Check the current course catalog.):

ART 312

ARCH 447

ART H 370, 464, 494, 594

ENGL 395

GERST 660

AS&RC 304, 503

ANTHR 320, 322, 453

First Year

Fall Term (Required Curriculum)	*Credits*
111 Introductory Art Seminar	1
Art History Elective	4
121 Introductory Painting	3
or	
141 Introductory Sculpture	3
151 Drawing I	3
Freshman Writing Seminar	3
In/Out College Electives	3
	17
Spring Term (Required Curriculum)	
Art History Elective	4
121 Introductory Painting	3
or	
141 Introductory Sculpture	3
152 Drawing II	3
One of the following:	3
131 Introductory Etching	
132 Introductory Graphics	
133 Introductory Lithography	
or	
161 Introductory Photography	3
Freshman Writing Seminar	3
	16

Second Year

Fall Term (Required Curriculum)	
161 Introductory Photography	3
171 Electronic Imaging in Art	3
251 Drawing III	3
Out-College Elective (OCE)/Art History	4
OCE	3
	16
Spring Term	
200 Level Studio	4
200 Level Studio	4
252 Drawing IV	3
OCE/Art History	4
OCE	3
	18

Third Year

Fall Term	
200 Level Studio	4
Art Studio concentration	4
300-level course in Theory and Criticism	3
OCE	3
In/OCE	3
	17
Spring Term	*Credits*
Art Studio concentration	4
OCE/Art History	4
In/OCE's	7
	15

Fourth Year

Fall Term	
Pre-Thesis	6
In/OCE's	10
	16
Spring Term	
Thesis	6
In/OCE's	9
	15

The M.F.A. Program

The Master of Fine Arts program requires four terms of full-time study, equal to a minimum of 60 credits. Graduate work done elsewhere or in the summer session is not applicable to the M.F.A. degree. The curriculum leading to the master's degree is flexible to accommodate the needs of the individual student and to enable the student to partake of the greater Cornell community. The ratio of graduate faculty to students allows an exceptional opportunity for individual mentoring. Graduate students are provided individual studios and have 24-hour access to studios and labs.

Graduate students in art may enroll in introductory or advanced courses in any field of study offered at the university. Fifteen credits are required in each term; of these, nine credits are in studio work, and three credits are in Graduate Seminar (ART 611, 612, 613, 614). Students are required to take at least twelve credits of academic work outside the Department of Art during their four terms in residence. Candidates for the Master of Fine Arts degree must have completed eighteen credits in the history of art in the course of their graduate and/or undergraduate study. Every M.F.A. candidate must prepare a written statement, offer a thesis exhibition of studio work completed during residency, and give an oral defense of the written statement and visual thesis. Gallery space is provided for a one-week solo thesis exhibition during the final spring semester.

Course Information

Most courses in the Department of Art are open to students in any college of the university who have fulfilled the prerequisites or have permission of the instructor.

Fees are charged for all studio courses. See the specific course description for course fees.

To take advantage of the special opportunities afforded by summer study, there are several course offerings during summer session.

Guidelines for Independent Study

A student who wants to undertake Independent Study must be a junior and in good academic standing. Fine Arts students must have completed two years of the curriculum, **including all first- and second-year studios and four semesters of drawing.** Students must have prior approval to have an independent study count as a drawing requirement. All students must have taken a minimum of one Cornell Art Department course in the area of the proposed independent study. It is recommended that the student take the independent study with a professor with whom they have previously studied. Out-of-department students may be exempt from the studio sequence requirement at the discretion of the supervising professor. Independent studies must be petitioned to count toward required studio courses. Credit hours are variable up to a maximum of four.

Courses in Theory and Criticism

ART 111 Introductory Art Seminar
Fall. 1 credit. S-U only. Limited to B.F.A. students.
Students meet each week with a different member of the faculty. The varying artistic interests of the faculty are presented and discussed. A maximum of two absences is allowed except by permission of chairman.

ART 214 Art and the Multicultural Experience
Fall. 3 credits.
This course will investigate selected topics related to art and the multicultural experience. Students will study the basic vocabulary and tools used in the expression of art. They question the nature of the visual arts as a discipline and survey art created by under-

represented American minority cultural groups.

ART 312 Modern Art in Italy
Fall or spring. 3 credits. Rome Program only.
This course is designed to introduce students to contemporary developments in Italian art and to major issues concerning the art world. Significant movements of the twentieth century, including Futurism, Metaphysical painting, and Magic Realism will be discussed. Post-war painting and sculpture will be emphasized. Visits with artists in studios, galleries, and museums introduce students to the exchange between artists, dealers, and critics. Fulfills 300-level Theory and Criticism requirement for Fine Arts majors.

ART 317 History of Art in Rome: Early Christian to the Baroque Age
Fall. 4 credits. Rome Program only.
General survey of the early Christian period to the fantastic vision of Piranesi in the eighteenth century. Special emphasis is placed on the developments of the Renaissance and Baroque periods. Weekly lecture and field trips.

ART 318 History of Art in Rome: Renaissance in Rome and Florence
Spring. 4 credits. Rome Program only.
A direct knowledge of art in its historical context is the aim of this course. Open both to students interested in history and to those concentrating on the visual impact of art. Included are lectures and field trips.

ART 419 Independent Study/Supervised Readings in Art
Fall, spring, or summer. Credits variable (maximum 4). Prerequisite: student must be a junior in good academic standing and have the written permission of the instructor.
Independent reading and research allows a student the opportunity to investigate special interests that are not treated in regularly scheduled courses. The student develops a plan of study to pursue under the supervision of a faculty member.

ART 611 Professional Skills for the Visual Artist
Fall. 3 credits. Limited to M.F.A. students.
This seminar will help fine arts graduate students build professional skills that will assist them in their careers as practicing artists and in their work at art-related employment. Students will complete a resource notebook that will be useful to them in the years after they graduate. Topics include: funding resources, exhibition opportunities, employment options, documentation of work, health, safety, and legal issues.

ART 612 Recent Practice in the Visual Arts
Spring. 3 credits. Limited to M.F.A. students.
This seminar is designed to provide graduate students with an overview of recent visual artwork. Students will study work from a wide range of artists who have received significant recognition within the visual arts community. Reviews of major exhibitions such as Documenta, La Biennale di Venezia, and the Whitney Biennial are discussed. Students will be encouraged to travel to nearby cities to look at contemporary work.

ART 613 On-Line Publication for the Visual Artist
Fall. 3 credits. Limited to M.F.A. students.
This seminar is designed to introduce graduate students to the basic principles of electronic imaging. As a major project, each student interviews a contemporary visual artist. These interviews are illustrated with digital images of each artist's work and combined in an on-line magazine. Additionally each student learns to create a home page on the web.

ART 614 Contemporary Theory in the Visual Arts
Spring. 3 credits. Limited to M.F.A. students.
This seminar explores selected writings on the current issues represented within the visual arts. It is designed to introduce graduate students to several approaches to critical inquiry and analysis of contemporary visual practice. Topics vary but may include related criticism in areas such as visual culture, semiotics, identity politics, and institutional frames.

Studio Courses in Painting

Fees for painting courses: 121, 221, 321, 322, 421, 422, 429: $40

ART 121 Introductory Painting
Fall, spring, or summer. 3 credits.
The study of the language of painting through color, form, materials, and techniques. Aspects of traditional and modern pictorial composition are studied including proportion, space, and color theory through the representation of a variety of subjects.

ART 221 Painting II
Fall or spring. 4 credits. Prerequisite: ART 121 or permission of instructor.
A continuation of the study of aspects of pictorial composition initiated in ART 121, focusing on problems relating to the depiction of the figure, space, and light. Topics are explored within the context of historical and contemporary artistic expression.

ART 321 Painting III
Fall or spring. 4 credits. Prerequisite: ART 221 or permission of instructor.
An intensive study of painting materials and techniques to express pictorial ideas. A variety of traditional painting techniques are explored including egg tempera, fresco, gouache, encaustic, and oil. In addition, paints and associated techniques developed in the twentieth century are used as well as developing technologies applicable to the painting process.

ART 322 Painting IV
Fall or spring. 4 credits. Prerequisite: ART 321 or permission of instructor.
An advanced course centered on issues of artistic expression. A variety of painting media are used to address conceptual issues through representation as well as abstraction.

ART 421 Pre-Thesis in Painting
Fall or spring. 6 credits. Prerequisite: ART 322.
Advanced study of painting through assigned and independent projects using a variety of materials leading to the formulation of a thesis project.

ART 422 Thesis in Painting
Fall or spring. 6 credits. Prerequisite: ART 421.
A focussed independent project demonstrating creative ability and technical proficiency. Projects are exhibited in an appropriate space at the end of the term.

ART 429 Independent Studio in Painting
Fall, spring, or summer. 4 credits variable. Prerequisite: student must be a junior in good academic standing and have the written permission of the instructor.
Independent studio in painting allows students the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide their progress and evaluate their results.

ART 721–722, 821–822 Graduate Painting
721, fall; 722, spring; first-year M.F.A. students. 9 credits. 821, fall; 822, spring; second-year M.F.A. students. 9 credits.
Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they are to work. All members of the faculty are available for individual consultation.

Studio Courses in Printmaking

Fees for printmaking courses:

Intaglio: 131, 231, 431.1, 432.1, 439.1: $95
Lithography: 133, 233, 431.2, 432.2, 439.2: $95
Screenprinting: 132, 232, 431.3, 432.3, 439.3: $45

ART 131 Introductory Intaglio
Fall and spring. 3 credits.
A basic introduction to etching techniques, with emphasis on engraving, lift ground, relief printing, monotypes, and experimental techniques.

ART 132 Introductory Graphics
Fall and spring. 3 credits.
An introduction to the two-dimensional thought process and the language of vision. Students will explore design projects and the use of graphic materials, including collage, pochir, and screen printing.

ART 133 Introductory Lithography
Fall and spring. 3 credits.
The theory and practice of lithographic printing, using limestone block and aluminum plate. Basic lithographic techniques of crayon, wash, and transfer drawing are studied.

ART 231 Intaglio II
Spring. 4 credits. Prerequisite: ART 131.
A studio course in advanced etching techniques. Refinement of processes and ideas through the uses of acquatint, spit bite, lift ground, soft ground, and dry point in black and white with an introduction to multiple plate color printmaking.

ART 232 Advanced Screen Printing
Fall. 4 credits. Prerequisite: ART 132.
An exploration of the screen printing process as it applies to the fine arts. Students develop skills in multicolor printing using transparent inks and additives. Stencils are made by the handcut and the photo process.

ART 233 Lithography II
Spring. 4 credits. Prerequisite: ART 133.
The theory and practice of lithographic printing using lithographic stones and aluminum plates. Traditional techniques in crayon, tusche wash, and color printing as well as photolithography using kodalith and computer-generated transparencies.

ART 331 Printmaking III
Fall or spring. 4 credits. Prerequisite: ART 231, 232, or 233 or permission of instructor.
Study of the art of graphics through both assigned and independent projects. Work may concentrate in any one of the graphic media or in a combination of media.

ART 332 Printmaking IV
Fall. 4 credits. Prerequisite: ART 331 or permission of instructor.
Continuation and expansion of ART 331.

ART 431 Pre-Thesis in Printmaking
Fall or spring. 6 credits. Prerequisite: ART 332.
Further study of the art of graphics through both assigned and independent projects executed in various media. Instruction through group discussions and individual criticism.

ART 432 Thesis in Printmaking
Fall or spring. 6 credits. Prerequisite: ART 431.
Advanced printmaking project to demonstrate creative ability and technical proficiency.

ART 439 Independent Studio in Printmaking
Fall, spring, or summer. 4 credits variable. Prerequisite: student must be a junior in good academic standing and have the written permission of the instructor.
Independent studio in printmaking allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide their progress and evaluate their results.

ART 731–732, 831–832 Graduate Printmaking
731, fall; 732, spring; first-year M.F.A. students. 9 credits. 831, fall; 832, spring; second-year M.F.A. students. 9 credits.
Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they will work. Members of the faculty are available for consultation; discussion sessions of work in progress are held.

Studio Courses in Sculpture

Fees for sculpture courses:

141:	$50
241, 341, 342, 343, 441, 442:	$75

ART 141 Introductory Sculpture
Fall, spring, or summer. 3 credits.
A series of studio problems introduce the student to the basic principles of artistic expression in three-dimensionals, i.e., clay modeling, direct plaster, plaster casting, and construction in wood, metal, and other materials.

ART 241 Sculpture II
Fall or spring. 4 credits. Prerequisites: ART 141, or an architecture design studio, or permission of instructor.
Various materials, including clay, plaster, wood, stone, and metal, are used for exercises involving figurative modeling, abstract carving, and other aspects of three-dimensional form and design. Beginning in the second year, students are encouraged to explore bronze/metal casting processes. The sculpture program, which is housed in its own building, contains a fully equipped bronze casting foundry.

ART 341 Sculpture III
Fall or spring. 4 credits. Prerequisite: ART 241 or permission of instructor.
Continued study of the principles of sculpture and conceptual development. Each student explores the selection and expressive use of materials, media, scale and content. Group discussions and individual criticism. Experimentation is encouraged.

ART 342 Sculpture IV
Fall or spring. 4 credits. Prerequisite: ART 341 or permission of instructor.
Continuation and expansion of ART 341. Special projects may include site-specific and/or large-scale installations.

ART 343 Sculpture V
Fall or spring. 4 credits. Prerequisite: ART 342 or permission of instructor.
Continued study of the principles of sculpture and the selection and expressive use of materials and media. Group discussions and individual criticism.

ART 441 Pre-Thesis in Sculpture
Fall or spring. 6 credits. Prerequisite: ART 343.
Further study of the art of sculpture through both assigned and independent projects executed in various media. Instruction through bi-monthly group discussions and individual criticism. Students complete a body of work through an approved statement of purpose and proposed schedule.

ART 442 Thesis in Sculpture
Fall or spring. 6 credits. Prerequisite: ART 441.
Advanced sculpture project to demonstrate creative ability and technical proficiency culminating in a cohesive B.F.A. thesis exhibition.

ART 449 Independent Studio in Sculpture
Fall, spring, or summer. 4 credits variable. Prerequisite: student must be a junior in good academic standing and have the written permission of the instructor.
Independent studio in sculpture allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide their progress and evaluate their results.

ART 741–742, 841–842 Graduate Sculpture
741, fall; 742, spring; first-year M.F.A. students. 9 credits. 841, fall; 842, spring; second-year M.F.A. students. 9 credits.
Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they are to work. All members of the faculty are available for individual consultation. Weekly discussion sessions of works in progress are held.

Studio Courses in Photography

Darkroom fees for photography courses:

Fee for B & W courses:	$135
Fee for color courses:	$215
Fee for an additional B & W course taken the same term:	$55
Fee for an additional color course taken the same term:	$135

ART 161 Photography I (also ARCH 251)
Fall, spring, or summer. 3 credits.
A basic lecture-studio course in black and white photography for beginners. Emphasis is on basic camera skills, darkroom techniques, and understanding of photographic imagery.

ART 168 Black-and-White Photography
Summer. 3 credits. 3-week session only.
Intended for students at all levels, from introductory to advanced. Emphasis on camera skills, darkroom techniques, and the content of black-and-white photographic imagery.

ART 169 Color Photography
Summer. 3 credits. 3-week session only.
Intended for students at all levels, from introductory to advanced. Emphasis on camera skills, darkroom techniques, and the content of color photographic imagery.

ART 261 Photography II (also ARCH 351)
Fall, spring, or summer. 4 credits. Prerequisite: ART 161 or ARCH 251, or permission of instructor.
A continuation of Photography I concentrating on black and white photographic processes, history and theory of creative practice, and individual projects.

ART 263 Color Photography
Fall, spring, or summer. 4 credits. Prerequisite: ART 161 or ARCH 251, or permission of instructor.
A studio course in color photography with emphasis on camera skills, darkroom techniques, and the content of color photography.

ART 264 Photo Processes
Fall, spring, or summer. 4 credits. Prerequisite: ART 161 or ARCH 251, or permission of instructor.
A studio course in alternative and nonsilver photographic processes. Emphasis is on camera skill, basic techniques and processes, image content, and creative use of photo processes.

ART 265 Studio Photography
Fall or spring. 4 credits. Prerequisite: ART 161 or ARCH 251, or permission of instructor.
A course in the use of medium- and large-format cameras that explores technique, lighting, and the use of larger-format cameras for personal expression both in the studio and outdoors.

ART 361 Photography III
Fall, spring, or summer. 4 credits. Prerequisite: ART 161, 261, or permission of instructor.
Continued study of creative use of photography, with emphasis on specialized individual projects.

ART 461 Pre-Thesis in Photography
Fall or spring. 6 credits. Prerequisite: ART 261, 263.
A studio course intended for photography majors and other qualified students.

ART 462 Thesis in Photography
Fall or spring. 6 credits. Prerequisite: ART 461.
A studio course intended for photography majors and other qualified students. Advanced photography project to demonstrate creative ability and technical proficiency.

ART 469 Independent Studio in Photography
Fall, spring, or summer. 4 credits variable. Prerequisite: student must be a junior in good academic standing and have the written permission of the instructor.
Independent studio in photography allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide their progress and evaluate their results.

ART 761–762, 861–862 Graduate Photography
761, fall; 762, spring; first-year M.F.A. students. 9 credits. 861, fall; 862, spring; second-year M.F.A. students. 9 credits.
Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they will work. Members of the faculty are available for consultation. Discussion sessions of work in progress are held.

Studio Courses in Drawing

Fees for all drawing courses: $25

ART 151 Drawing I
Fall, spring, or summer. 3 credits.
A course that is general in nature and introduces students to principles and techniques of representation. Emphasis will be on creating the illusion of space and form through line, the rendering of light and shade, and studies in perspective. In addition, students have the opportunity to explore various media such as charcoal, chalk, pencil, pen, ink and wash, etc.

ART 152 Drawing II
Spring. 3 credits. Prerequisite: ART 151.
A general course in drawing that emphasizes figure study and life drawing. This course will build on the foundation of ART 151 and concentrates on the analytical study of the figure. Students explore a variety of materials, traditional and contemporary.

ART 158 Conceptual Drawing
Summer. 3 credits. 6-week session only.
Emphasis on drawing from the imagination. The generation of ideas and their development in sketches is stressed. The intent is not to produce finished art but rather to experience a series of problems that require image and design concepts different from those of the artist working directly from nature.

ART 159 Life and Still-Life Drawing
Summer. 3 credits. 6-week session only.
The human figure and still life are studied both as isolated phenomena and in relation to their environment. Focuses are on helping the student observe and discover.

ART 251 Drawing III
Fall. 3 credits. Prerequisite: ART 152.
An intermediate drawing course where students study composition, the articulation of form, and the illusion of space in a variety of materials. Expressive content, conceptualization, and the exploration of materials are stressed.

ART 252 Drawing IV
Spring. 3 credits. Prerequisite: ART 251.
Advanced drawing with an emphasis on life drawing and figure composition. Individual expression is encouraged along with creative investigation of materials and processes.

ART 459 Independent Studio in Drawing
Fall, spring, or summer. 4 credits variable. Prerequisite: student must be a junior in good academic standing and have the written permission of the instructor.
Independent studio in drawing allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide their progress and evaluate their results.

Special Studio Courses

Course fees:

171, 372, 479	$250
271, 272	$105
391, 392	$ 50
481, 482, 489	$ 70

ART 171 Electronic Imaging in Art
Fall or spring. 3 credits.
An introductory studio course using the computer as a tool for making art. Students explore various approaches to 2- and 3-D webart using software programs and various functions. Intro to the web.

ART 271 Electronic 3-D Modeling and Animation
Fall or spring. 4 credits. Prerequisite: ART 171.
A studio course in creating 2- and 3-D still and animated visualizations using computers and 3-D software for object modeling, animation, and rendering. Concentration on the web.

ART 272 Digital Video and Sound
Fall or spring. 4 credits. Prerequisite: ART 171.
A studio course that introduces students to digital video including capture stills, animation, video, and sound with an introduction to interactive presentation and CD ROM production. Concentration on the web.

ART 372 Special Topics in Art Studio
Fall, spring, or summer. 4 credits variable.
An exploration of a particular theme or project.

ART 379 Independent Studio in Rome
Fall and spring. 4 credits variable. Prerequisite: student must be a junior in good academic standing, and have the written permission of the instructor. Rome Program only.
Independent studio in Rome allows non-art majors the opportunity to pursue special interests in fine arts not treated in regularly scheduled courses. The student plans a course of study or projects that meet the approval of the faculty member selected to guide their progress and evaluate the results.

ART 391 Media Arts Studio I
Fall. 3 credits. Prerequisite: one of the following courses: ART 171, THETR 277, 377, MUSIC 120, or equivalent; and student must be a junior and have permission of the instructor. Lab fee $50.
A collaborative interdisciplinary studio course in a variety of digital and electronic media, including art, architecture, music, film and video, and dance. Group projects and discussions also investigate the artistic and interactive potential of a high-speed Intranet connecting arts spaces on campus, including virtual and performative events.

ART 392 Media Arts Studio II
Spring. 3 credits. Prerequisite: one of the following courses: ART 171, THETR 277, THETR 377, MUSIC 120, or equivalent. Also student must be a junior and have permission of instructor. Lab fee $50.
A continuation of ART 391. A collaborative interdisciplinary studio course in a variety of digital and electronic media, including art, architecture, music, dance, film, and video. Group projects and discussions also investigate the artistic and interactive potential of a high-speed Intranet connecting arts spaces on campus, including virtual and performative events.

ART 400 Rome Studio
Fall or spring. 4 credits. Rome Program only. Prerequisite: permission of instructor. Fee: $25.
The content for the Rome studio is determined by the instructor. Emphasis is divided between work accomplished in the studio and work executed outdoors in the environs of Rome. Media consist primarily of painting, drawing, sculpture, and photography, or those assigned by the instructor. ART 400 fulfills four credits of the concentration requirement.

ART 479 Independent Studio in Electronic Imaging
Fall, spring, or summer. 4 credits variable. Prerequisite: student must be a junior in good academic standing and have the written permission of the instructor.
Independent studio in electronic imaging allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide their progress and evaluate their results.

ART 481 Pre-Thesis in Combined Media
Fall or spring. 6 credits. Prerequisite: written permission of instructor on a combined media thesis form must be received in the art department prior to enrollment in the course.
Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they will work. Projects should reflect experiences gained by exploring and combining various media including those taken in studio courses outside the department. Students select a faculty member from the area of concentration most appropriate to their area of combined media.

ART 482 Thesis in Combined Media
Fall or spring. 6 credits. Prerequisite: ART 481 and written permission of instructor on a combined media thesis form must be received in the art department prior to enrollment in this course.
Students are responsible, under faculty direction, for planning their own projects and selecting the media in which they will work. The projects should reflect experiences gained by exploring and combining various media including those taken in studio courses outside the department. Students select a faculty member from the area of concentration most appropriate to their area of combined media.

ART 489 Independent Studio in Combined Media
Fall, spring, or summer. Cedits variable (maximum 4). Prerequisite: student must be a junior in good academic standing and

have the written permission of the instructor.

Independent studio in combined media allows the student the opportunity to pursue special interests not treated in regularly scheduled courses. The student plans study and projects under the supervision of a faculty member selected to guide their progress and evaluate their results.

CITY AND REGIONAL PLANNING

P. Clavel, chair; I. Azis (visiting), S. Baugher, L. Benería, R. S. Booth, S. Christopherson, S. Czamanski (emeritus), M. Drennan, A. M. Esnard, J. F. Forester, W. W. Goldsmith, director, URS; W. Isard (emeritus), D. Lewis, J. Lobo, B. Lynch, P. Olpadwala, R. Pendall, K. Reardon, J. W. Reps (emeritus), S. Saltzman, S. W. Stein (emeritus), M. A. Tomlan, R. T. Trancik, T. Vietorisz (visiting), M. Warner.

The department offers several programs of study at both the undergraduate and graduate levels.

The Undergraduate Program in Urban and Regional Studies

The Program in Urban and Regional Studies (URS) is a four-year academic program aimed at assessing the problems of human communities and regions. Students who graduate from the program receive a Bachelor of Science degree. The program provides both an excellent liberal arts education and a strong concentration of studies respecting urban and regional issues. The urban and regional studies courses in the program provide students with a broad understanding of relevant issues, the ability to assess those issues, and technical analysis skills. The URS Program is truly interdisciplinary. Students learn to evaluate urban and regional problems by using a wide range of analytic tools and disciplinary perspectives.

Basic Degree Requirements

Requirements for Graduation: URS requirements include: (1) eight semesters of residence; (2) 120 credits; (3) two freshman seminars; (4) qualification in one foreign language; (5) four groups of distribution requirements; (6) required courses for major; (7) area requirements for major; (8) free electives; (9) a minimum of 34 courses; and (10) completion of the university requirement of two one-credit nonacademic courses in physical education. Please note that physical education credit does not count toward graduation or toward the 12-credit minimum required for good academic standing each semester. Please note that no course may satisfy more than one requirement.

1. General education

a. Freshman writing seminars: 2 courses

b. Foreign language: 3 courses or qualification in one foreign language

c. Distribution Requirements: 9 courses

Students must take a total of nine courses for the distribution requirement: four courses (of three or more credits each) from Groups 1 and 2, at least two of which are from Group 1, and at least one of which is from Group 2; five courses from Groups 3 and 4, with at least two in each group and two in the same department. No single course may satisfy more than one distribution requirement. URS students must follow the College of Arts and Sciences guidelines specifying courses that meet the requirements for groups 1–4.

Group 1: Physical and biological sciences (2–3 courses required)

Group 2: Quantitative and formal reasoning (1–2 courses required)

Group 3: Social sciences and history (2–3 courses required)

Group 4: Humanities and the arts (2–3 courses required)

Advanced Placement Credit

Students may apply up to two courses of approved advanced placement credit in calculus, computer science, and science toward satisfaction of the distribution requirement in Groups 1 and 2 above, if they complete at least one science course during their undergraduate career. They may apply no advanced placement credit toward the distribution requirement in Groups 3 and 4. Grades of S-U courses cannot be applied to the distribution requirements.

2. Required Courses for the Major in Urban and Regional Studies: 5 courses

CRP 100: The American City

CRP 101: The Global City: People, Production, and Planning in the Third World

CRP 223: Introduction to Statistical Reasoning for Urban and Regional Analysis or from the following list:

ARME 210: Introduction to Statistics

ILRST 210: Statistical Reasoning I

Microeconomics course (at least 3 credits, from approved list)

Architecture course (at least 3 credits, from approved list)

Approved List of Microeconomics and Architecture Courses

Micro Economics:

ARME 250: Introduction to Statistics

PAM 200: Intermediate Microeconomics

ECON 101: Introduction to Microeconomics

ECON 301: Microeconomics

ARCH 131: An Introduction to Architecture I

ARCH 132: An Introduction to Architecture II

ARCH 181: History of Architecture I

ARCH 182: History of Architecture II

ARCH 399: Special Topics: Architectural History (Rome)

3. Area Requirements for the Major in Urban and Regional Studies: 11 courses

A. Students must take one listed CRP course in each of the following 6 areas: Design, Economics, Environment, History, Politics/Policy, Quantitative Analysis

a. Design

CRP 381: Principles of Spatial Design and Aesthetics

CRP 491: Rome Wasn't Built in a Day

b. Economics

CRP 370: Regional Question: The Case of Italy (Rome)

CRP 401: Seminar in Urban Political Economy

CRP 404: Urban Economics

CRP 417: Industrial Restructuring: Implications for State and Local Policy

c. Environment

CRP 380: Environmental Politics

CRP 395.15: Recycling & Solid Waste

CRP 395.31: Green Cities

CRP 443: Emerging Global Environmental Trends

*CRP 444: Resource Management & Environmental Law

*CRP 451: Environmental Law

*CRP 453: Environmental Aspects of International Planning

*Meets requirement only with instructor's permission.

d. History

CRP 261: Urban Archaeology

CRP 360: Pre-Industrial Cities and Towns of North America

CRP 361: Seminar in American Urban History

ARCH 399: Special Topics: Architectural History (Rome)

ART 317.20: Art History: Early Christian, Romanesque, and Gothic Art in Rome and Central Italy (Rome)

ART 318.20: Art History: Renaissance in Rome (Rome)

ART H 371: The History of Washington Architecture (Cornell-in-Washington)

HIST 419: Seminar in American Social History: Race, Class, and the American City (Cornell-in-Washington)

e. Politics/Policy

CRP 293: Inequality, Diversity, and Justice

CRP 314: Planning, Power, and Decision Making

CRP 318: Politics of Community Development

CRP 363: American Indians, Planners, and Public Policy

CRP 371: Cuba: The Search for Developing Alternatives

CRP 395.30: Latin American Cities

CRP 412: Devolution and Public Sector Restructuring

CRP 416: European City-Urban Political Economy (Rome)

CRP 418: Local Government Restructuring in New York

CRP 448: Social Policy and Social Welfare (also Cornell-in-Washington)

CRP 474: The Third World Urbanization

GOVT 500: Politics/Policy: Theory, Research, and Practice (Cornell-in-Washington)

(4 credits of the 8-credit course—see B below)

f. Quantitative Analysis

CRP 321: Introduction to Quantitative Methods for the Analysis of Public Policy

CRP 328: Overview: Quantitative Methods Policy Analysis

CRP 529: Mathematics for Planners

ILRST 211: Quantitative Reasoning II

B. Students must take any additional 5 CRP courses (of at least 3 credits each, letter grade only)

NOTE: Cornell-in-Washington Program: GOVT 500: Politics/Policy: Theory, Research, and Practice can be used to fulfill four credits.

4. Free Electives: 6–9 courses

5. Physical Education (2 terms of PE)

Required courses for graduation: 34

Required credits: 120

Honors Program

Each year a few well-qualified juniors may join the honors program. Each honors student develops and writes an honors thesis under the guidance of his or her faculty adviser.

Concentrations

The department recognizes concentrations earned within the university (accepting standards set by various colleges). Students may apply for concentrations in any college (e.g. Africana Studies, Architecture, Latino Studies, Southeast Asian Studies, Women's Studies, etc.). When a student satisfies the requirements for a concentration, and formal notification is received by the AAP Registrar, the concentration will be recorded on the student's official transcript.

Off-Campus Opportunities

Cornell-in-Washington Program. Students in good standing may earn degree credits in the Cornell-in-Washington program through course work and an urban-oriented externship in Washington, D.C. Students may work as externs with congressional offices, executive-branch agencies, interest groups, research institutions, and other organizations involved in the political process and public policy. Students also select one or two other seminars from such fields as government, history, economics, human development, architectural history, natural resources, and social policy. Cornell faculty members teach these seminars, which provide credit toward fulfillment of major, distribution, and other academic requirements.

Cornell Abroad. Qualified undergraduates are encouraged to study abroad because exposure to foreign cultures can be an eye-opening aspect of a university education. In an increasingly interdependent world, the experience of living and learning in a foreign country is invaluable. Study abroad opportunities are continually being developed. Current programs are available in Great Britain, Spain, and Germany. Opportunities in Asia, the Mideast, and France should be forthcoming. We encourage URS students to explore these opportunities.

Cornell-in-Rome Program. The College of Architecture, Art, and Planning has a teaching facility in Rome located in the sixteenth-century Palazzo Massimo. Students in good standing can earn degree credits through courses taken with Cornell faculty assigned to Rome and with accredited instructors. Courses are available in areas of urban development, regional development, and architecture and art.

Research and fieldwork. Students are welcome to work with department faculty members on research or other opportunities that are appropriate to their particular interests. Fieldwork and community-service options also exist for students in the Urban and Regional Studies Program.

Additional Degree Options

Linked degree options. Urban and regional studies students may earn both a Bachelor of Science degree and a Master of Regional Planning (M.R.P.) degree in a fifth year of study. Ordinarily the professional M.R.P. degree requires two years of work beyond that for the bachelor's degree. Under this option, a minimum of 30 credits and a master's thesis or thesis project are required for the M.R.P. degree. Interested students apply to the Graduate School, usually in the senior year.

Dual degree option. A student accepted in the Cornell College of Arts and Sciences may earn both a B.A. in a College of Arts and Sciences major and a B.S. in urban and regional studies in a total of five years. Special requirements have been established for this dual degree program. Cornell students interested in pursuing the dual degree program should contact either the director of the Urban and Regional Studies Program or the appropriate dean of the College of Arts and Sciences for further information.

Admissions Requirements and Procedures

Among the most important criteria for admission to the Urban and Regional Studies Program are intellectual potential and commitment—a combination of ability, achievement, motivation, diligence, and use of educational and social opportunities. Nonacademic qualifications are important as well. The department encourages students with outstanding personal qualities, initiative, and leadership ability. Above all, the department seeks students with a high level of enthusiasm and depth of interest in the study of urban and regional issues. Applicants must complete a university admission application.

Transfer Students

In most cases, transfer applicants should no longer be affiliated with a high school and should have completed no fewer than 12 credits of college or university work at the time of application. High school students who have completed graduation requirements at midyear and are taking college courses for the rest of the academic year should apply as freshmen. Prospective candidates who believe that their circumstances are exceptional should consult with the Director of Admissions in the Cornell division of interest to them before filing an application.

Forms for transfer application and financial aid are available from the Cornell University Office of Admissions, 410 Thurston Avenue, Ithaca, NY 14850–2488. Official transcripts of all high school and college work must be submitted along with SAT or ACT scores and letters of recommendation.

Prospective transfers should have taken at least 6 credits in English. In addition, students should have taken basic college-level courses distributed across the natural and social sciences, humanities, and mathematics. Applicants whose previous course work closely parallels the "General Education" requirements of the Urban and Regional Studies curriculum will have relative ease in transferring. Nevertheless, students with other academic backgrounds, such as engineering, architecture, fine arts, management, and agriculture, are eligible to apply.

Although an interview is not required, applicants are urged to visit the campus. Applicants who want further information regarding the Urban and Regional Studies Program, may contact Professor William W. Goldsmith, Program Director, Urban and Regional Studies, Cornell University, 106 West Sibley Hall, Ithaca, NY 14853–6701 (telephone: 607–255–4613).

The Graduate Program in City and Regional Planning

There are five graduate degree programs in the city and regional planning department. The Master of Regional Planning program stresses skills basic to professional planning practice and responds to individual needs and interests. The faculty strongly recommends that students concentrate in one of three areas of planning. The Land Use and Environmental Planning concentration focuses on the forces and actions that directly affect the physical character, transformation, rehabilitation, and preservation of cities and regions. Economic Development Planning: Communities and Regions focuses on the economies of neighborhoods, cities, and regions with the intent of producing more informed and effective economic development policy. International Studies in Planning (ISP) focuses on urban, regional, and international development processes and their implications for people's lives and livelihoods in diverse international contexts.

The Master of Professional Studies in International Development (MPS/ID) degree is administered jointly with the Cornell International Institute for Food, Agriculture, and Development (CIIFAD). Is it intended to meet the specific training needs of experienced planners or mid-career professionals in related fields.

The 60-credit Master of Arts (MA) in Historic Preservation Planning prepares students for professional work in the creative preservation and utilization of our physical heritage.

The Master of Science (MS) or Master of Arts (MA) in Regional Science is the study of regional economies and their interactions with each other. Central issues include capital flows, trade, location of economic activity, growth, and regional conflicts. Graduates are positioned for careers as researchers and policy analysts at the highest levels in national

governments, corporations, and international organizations.

The Doctor of Philosophy (PhD) program is for those who seek advanced, specialized education for a career in teaching, research, or policy making.

Off-Campus Opportunities

Rome Program. Graduate students have the opportunity to spend one or two semesters in Rome, studying at Cornell's center at the Palazzo Massimo. Instruction is given by Cornell professors-in-residence and by other faculty. The program is structured to include work assignments in one of the international development organizations headquartered in Rome.

Course Information

Most courses in the Department of City and Regional Planning are open to students in any college of the university who have fulfilled the prerequisites and have the permission of the instructor.

The department attempts to offer courses according to the information that follows. However, students should check with the department at the beginning of each semester for late changes.

Undergraduate Program in Urban and Regional Studies

CRP 100 The American City
Fall. 3 credits. S-U grades optional for out-of-department students only.
An introductory course on the evolution of urban problems and opportunities facing the majority of this country's population as we enter the first decade of the twentieth-first century. Readings, discussions, and brief papers explore topics ranging from suburban development to central city poverty, from environmental threats to downtown revitalization, and from municipal finance to the new position of women in the urban economy.

CRP 101 The Global City: People, Production, and Planning in the Third World
Spring. 3 credits. S-U grades optional for out-of-department students only.
A critical look at the physical and social development of giant cities in the Third World. Their origins, roles, contributions, and shortcomings are examined. Their place in world political economy is evaluated. Policy prescriptions for their principal problems are discussed.

CRP 223 Introduction to Statistical Reasoning
Fall. 4 credits. Letter grade.
An introduction to the role and use of quantitative methods in the study of urban and regional issues. Emphasis is on statistical and related computer methods for the formulation, analysis, and testing of hypotheses and models of social, economic, and physical phenomena of cities and regions. This course covers applicable methods in probability, descriptive statistics, estimation, hypothesis testing, and regression.

CRP 261 Fieldwork in Urban Archaeology
Fall. 3 credits.
For description, see LA 261.

CRP 293 Inequality, Diversity and Justice (also GOVT 293, PHIL 193, SOC 293)
Fall. 4 credits.
For description, see PHIL 193.

CRP 314 Planning, Power, and Decision Making
Fall. 3 credits.
This seminar examines various bases of political and professional power. What do professionals who want to serve the public need to know about power and decision-making processes in the institutional settings in which they operate? How and why can professionals make a difference when facing problems characterized by great complexity and severe inequalities among affected groups? The course addresses these questions and many others.

CRP 318 Politics of Community Development (also CRP 518)
Spring. 3 credits. Letter grade.
A seminar on city economic development and community institutions. Attention to issues of local politics, planning, housing, and economics. Term papers on field investigations are encouraged. Topics vary from year to year.

CRP 321 Introduction to Quantitative Methods for the Analysis of Public Policy (also CRP 545)
Spring. 3 credits.
An introduction to the role and use of quantitative methods in the study of urban and regional issues. This course focuses on various types of models commonly used to analyze urban and regional policy, including regression models, cost-benefit analysis, simulation, and others. Strengths and weaknesses of those methods are also be considered.

[CRP 360 Pre-Industrial Cities and Towns of North America (also LA 260/LA 666 and CRP 666)
Fall. 3 credits. S-U grades optional. Not offered 2001–2002.
For description, see LA 260.]

CRP 361 Seminar in American Urban History (also CRP 662)
Fall or spring. 3 credits. Prerequisite: permission of instructor.
Seminar in the historical evolution of the American city. Emphasis on factors in urban growth, the process of urbanization, the urban reform movement, and intellectual and social responses to the city.

CRP 363 American Indians, Planners, and Public Policy (also CRP 547 and LA 263/LA 547)
Spring. 3 credits.
For description, see LA 263.

CRP 370 The Regional Question: The Case of Italy
Fall. 3 credits. For majors in urban and regional studies only. Rome Program only.
The "southern problem" in Italy has long interested regional planners, economists, sociologists, and political scientists. This course makes use of field trips to the Mezzorgiorno and Emilio-Romagna to explore practical aspects of regional inequality. Special attention is paid to theories that purport to explain why the south remains underdeveloped and why the "Third Italy" is thought to be one of the world's most successful regions—in economics, politics, and social life. The question of how Italy's integration into the European Union affects and is affected by its regional issues will be considered.

CRP 371 Cuba: The Search for Development Alternatives
Fall. 3 credits. Open to sophomores, juniors, seniors.
Cuba is a symbol; it is also a society. This course looks beyond the symbol to Cuban society, environment, and political economy in a Caribbean context. Cuba's relations with other nations and their impacts on Cuban development is emphasized. The 1959 Revolution was a defining moment in Cuban history and a central element in Cuban culture. Students learn about the experiences that shaped the revolution, altered its course in the 1970s and 1980s, and led to profound experimentation and a renewed search for authenticity in the 1990s.

CRP 380 Environmental Politics
Spring. 4 credits.
Examines the politics of public decisions affecting the environment. Focuses on the roles played by different political actors, the powers of various interest groups, methods for influencing environmental decisions, and the political and social impacts of those decisions.

CRP 381 Principles of Spatial Design and Aesthetics (also CRP 581)
Fall. 3 credits. Course enrollment requires special permission of instructor and is limited to 30 students.
A lecture course that introduces the spatial and visual design vocabularies of cities. Aesthetic principles and theories of design are investigated for different types of urban spaces drawn from a variety of international examples, historic and modern. Included in the course are design methods and applications in the contemporary urban context of Europe and North America.

CRP 395 Special Topics
Fall, spring, summer. 4 credits. Hours to be arranged.
For description, see department coordinator, 106 West Sibley.

CRP 395.03 Wilderness and Wildlands: Issues in Policy and Planning (also CRP 679.03)
Fall. 2–3 credits variable. Graduate seminar open to juniors and seniors. Not offered every year.
Wilderness and Wildland resources have been under assault by the Congress, the "Wise Use" movement, property rights activitists, pollutants and the actual users. This seminar will consider historical and philosophical foundations and political factors that impact decisions about wilderness policies, planning, acquisition, protection and management. The role of government, professional planners and managers, organized special interests, legal system, citizens, and user groups will be examined. Practical exposure to planning and policy development through readings, discussions, guest practitioners and field trip to Finger Lakes National Forest. Optional weekend trip to Adirondack Park Wilderness area.

CRP 395.40 The History of Urban Form in America (also CRP 669.40)
Fall. 3 credits.
This course covers the history of city planning in America from colonial times to the early 20th century including brief reviews of European influences on urban form. Lectures, discussions, and short papers.

CRP 400 Introduction to Urban and Regional Theory
Fall. 4 credits. Open to juniors and seniors. Introductory review of theories dealing with the spatial distribution of population and economic activity, drawn from various social science disciplines such as geography, economics, and sociology. Review of recent research dealing with such topics as population distribution, migration, location of industry and economic activity, and the spatial organization of urban and regional social systems.

CRP 401 Seminar in Urban Political Economy
Spring. 4 credits. Prerequisites: introductory economics or sociology; for URS students, CRP 400 also.
This course considers the world economy, the global city, and social change. Topics include: population, technology, and work in industrial and developing countries; race, ethnicity, and nationality; and profits, subsistence, and poverty. Students may read and direct discussions on outstanding texts, write book reviews, and prepare brief reports.

CRP 404 Urban Economics (also CRP 504)
Spring. 4 credits. Prerequisite: microeconomics.
Urban phenomena are analyzed from an economic point of view. Areas examined include economic aspects of urbanization processes and policies, determinants of urban growth and decline, urban land and housing markets, urban transportation, and urban public services. Some time is be spent in discussing problems of cities in developing countries.

CRP 408 Introduction to Urban Geographic Information Systems (GIS) (also CRP 508)
Spring. 4 credits. Letter grade.
Geographic Information Systems (GIS) have revolutionized the way we manage, analyze, and present spatial information. This course focuses on GIS in the social sciences. Many of the exercises and examples are based on planning issues, but the concepts can be applied to many other disciplines such as government, economics, natural resources, and sociology. Some of the issues covered include: fundamentals of spatial analysis; overview of GIS technology and applications; designing a GIS project; gathering and analyzing data; and creating thematic maps.

CRP 412 Devolution and Public Sector Restructuring (also CRP 612)
Fall. 3 credits. S-U grades optional.
This course addresses devolution and decentralization of government services in a national and international context and then focuses on the local public sector response in the United States. Privatization, intermunicipal cooperation, and internal restructuring are reviewed including changing roles for the private sector, nonprofit sector; and unions. Implications for policy, program design, public advocacy, and citizen involvement are addressed. A special topic may include welfare reform. Graduate students are expected to write a major research paper in addition to short papers throughout the term.

CRP 416 European City: The Public Sphere and Public Space
Fall. 2–4 credits variable. Open to all juniors and seniors. S-U option available to non-majors. Enrollment may be limited by the instructor. Rome Program only.
An examination of the social, economic, and political life of the European city, particularly Italian cities, especially Rome. Study of the socio-economic underpinnings of the city. How are cities organized, and how do citizens relate to the state, the city to the nation, the nation to the global market? How and where do different groups of people live? How do they travel, inside the city and from city to city? How are new parts of the city developed and old ones preserved, transformed, or destroyed? What public services do people expect, and how are they delivered? What is the role of private business? How do Italians/Europeans confront problems of the urban environment, poor neighborhood services, and impoverished immigrants? In all these cases, how do Italian (or European) conditions and policies differ from those in the United States (or elsewhere)? All of these questions are covered.

CRP 417 Industrial Restructuring: Implications for State and Local Policy (also CRP 517)
Fall. 4 credits.
A basic introduction to new issues arising from the way in which national and international economic shifts are affecting diverse United States localities. The course focuses on intra-industry restructuring, the location of economic activities, and state and local economic policy. Cases are drawn from a variety of industries and national situations, with specific application to New York and other Northeast locations.

CRP 418 Local Government Workshop (also CRP 618)
Spring. 4 credits. S-U grade optional. Prerequisite: CRP 412/612.
Students undertake research requested by local government clients (associations of local government, unions, non-profits, and state, federal, and international agencies) to analyze and identify alternative approaches to restructuring local government service delivery. The course requires teamwork and includes qualitative and quantitative methods of analysis in collaboration with clients.

CRP 442 The Sociology of Science
Fall. 4 credits.
For description, See S&TS 442.

CRP 443 Emerging Global Environmental Trends (also CRP 543)
Spring. 3 credits. Letter grade only. Limited to 20 students. Open to juniors, seniors, and graduate students, and by permission of instructor.
This seminar focuses on the emergence of broad trends that suggest human society is facing a global environmental crisis. It examines the factual grounds on which concern about these trends is founded, their implications, and the types of steps human society might take in order to reverse or otherwise alter these trends before they generate enormous and irreversible problems.

CRP 444 Resource Management and Environmental Law (also CRP 544)
Spring. 4 credits. Letter grade. Open to juniors, seniors, and graduate students, and by permission of instructor.
This course introduces the application of legal concepts and processes to the management of natural resources and natural resource areas. It explores the role of the common law, statutory law, administrative regulations, and judicial decisions in managing these resources. Particular focus is given to the management of wildlife, wetlands, and critical resources on public lands, and to the conflicts inherent in government attempts to regulate important natural resources on private lands.

CRP 448 Social Policy and Social Welfare (also CRP 548)
Spring. 4 credits.
This course addresses conceptual issues underlying social policy and the provision of social welfare and analyzes how different positions are reflected in a set of current social welfare controversies. The first part of the course introduces principles that guide the development of social policy including fairness and justice. Various conceptions of society are examined with reference to their influence on the nature and extent of social welfare provision, comparing the United States with other industrialized countries. The second part of the course examines the relationship between economic change and social policy in the United States. A series of current social policy controversies (such as AIDS, homelessness, abortion, and workfare) illustrate how values and assumptions about state, economy, and society affect forms of social welfare provisions and how they are administered.

CRP 451 Environmental Law (also CRP 551)
Fall. 4 credits.
An introduction to how the legal system handles environmental problems. Study of federal statutes (e.g. the National Environmental Policy Act, the Clean Air Act, and the Clean Water Act) and important judicial decisions that have been handed down under federal environmental statutes and regulations. Discussions cover environmental law topics from a policy management perspective. This course is designed for undergraduate and graduate students interested in urban issues, planning, natural resources, government, environmental engineering, law, business, architecture, landscape architecture, and other topics. Course assignments for graduate students differ in some aspects from those for undergraduates.

CRP 453 Environmental Aspects of International Planning (also CRP 683)
Fall. 3 credits. Open to advanced undergraduate and graduate students in planning, environmental studies, and related social and natural sciences.
This seminar examines the roles of diverse environmental actors—international organizations, national bureaucracies, scientific communities, NGOs, and social movement organizations—in shaping environmental debates and designing conservation and remediation programs in the Third World.

CRP 457 Community Service Fieldwork
Fall or spring. 4 credits variable. Permission of instructor required.
Undergraduate students work under the direction of a faculty member in the CRP department on a project that assists a public or nonprofit organization. Projects involve urban and regional issues as defined by a client and agreed upon by the faculty member.

CRP 461 Methods of Archival Research
Spring. 3 credits.
Examines of methods of using archival materials, including documents in the Cornell archives and regional history collection, for research in the history of architecture, historic

preservation, and history of urban development.

CRP 474 Third World Urbanization (also CRP 674)
Spring. 4 credits. S-U grades optional.
Colonialism and economic globalization have profoundly affected urban Third World societies and landscapes often by relegating everyday urban life to the margins and shrouding it in illegality. This course explores social, political, and spatial dimensions of these processes. Covered are rural-urban dynamics and their implications for the structure of urban space and for concepts of state and citizenship. The position of Third World cities in the global economy and implications for employment are assessed, paying special attention to women workers and urban environment. The second half of the course focuses on responses to these massive changes: violence and repression, social movements, and transmigration.

CRP 477 Issues in African Development (also CRP 677)
Fall and spring. 1 credit. S-U only.
This course examines a broad range of critical concerns in contemporary Africa including food production, human resource development, migration, urbanization, environmental resource management, economic growth, and policy guidance. The weekly presentations are made by invited specialists. Students are required to write a term paper.

CRP 490 Student-Faculty Research
Fall or spring. 1–4 credits. Limited to undergraduate students in the Urban and Regional Studies Program. S-U grades only.
Research, reading and/or writing project in which a student and faculty member choose a topic related to urban and regional studies.

CRP 491 Rome Wasn't Built in a Day
Spring. 3 credits. Letter grade.
In this electronic course, students learn about how the form and spatial structure of the city of Rome has evolved through time. Using the interactive CD-ROM, *Layers of Rome* as a digital text, the course engages participants in the investigations of urban design in Rome both as a case study and as a vehicle for exploring concepts applicable to many contemporary cities worldwide. The material focuses on the intersection between historical studies of urban space, architectural geography, urban landscape formation, and the design of cities. Lectures, research, readings, and exercises are developed using the *Layers of Rome* CD, web searches, digital networking, and various interactive learning technologies geared toward urban analysis and visual design media.

CRP 492 Honors Thesis Research
Fall or spring. 4 credits. Limited to Urban and Regional Studies Program majors who have been selected as honor students by the department faculty.
Each selected student works with his or her thesis adviser.

CRP 493 Honors Thesis Writing
Fall or spring. 4 credits. Prerequisite: completion of CRP 492.
Each selected student works with his or her thesis adviser.

CRP 497 Supervised Readings
Fall or spring. Variable 4 credits. Limited to juniors and seniors. Prerequisite: permission of instructor.

Graduate Courses and Seminars

Courses numbered from 500 to 599 and 600 to 699 are generally considered introductory or first-year courses; those numbered from 700 to 799 and 800 to 899 are generally considered more advanced. Upperclass undergraduate courses are numbered from 300 to 499. (Undergraduate students with the necessary prerequisites and permission of the instructor may enroll in courses numbered 500 and above.)

CRP 504 Urban Economics (also CRP 404)
Spring. 4 credits. Prerequisite: microeconomics.
For description, see CRP 404.

CRP 508 Introduction to Urban Geographic Information Systems (GIS) (also CRP 408)
Spring. 4 credits. Letter grade.
For description, see CRP 408.

CRP 512 Public and Spatial Economics for Planners
Fall. 3 credits. Letter grade. No prior knowledge of economics necessary.
Covers basic microeconomic theory and some topics in macroeconomics. What distinguishes it from foundation courses in economics is that the context of every topic is both spatial and public. The concept of space is central to city and regional planning. The perspective of the public and nonprofit sectors is the same as that of city and regional planning. Both space and the public-nonprofit sectors are peripheral to (or absent from) the usual graduate foundations courses in economics. The course also covers the economic theory necessary to understand the many applications of economics presented in subsequent courses in city and regional planning.

CRP 513 Planning Practice and Urban Structure Seminar
Fall. 4 credits.
This introductory graduate seminar has several objectives. It exposes students to the theory and history of: (1) planning, administration, and related public intervention in urban affairs; (2) the growth and development of cities; and (3) the built environment. Topics are analyzed from the perspective of political economy. Students improve their understanding of the planning process and of the urban application of the social sciences, get practice in writing short papers, and explore one research topic in depth.

CRP 517 Industrial Restructuring: Implications for State and Local Policy (also CRP 417)
Fall. 4 credits.
For description, see CRP 417.

CRP 518 Politics of Community Development (also CRP 318)
Spring. 3 credits. Letter grade.
For description, see CRP 318.

CRP 519 Urban Theory and Spatial Development
Spring. 3 credits. Letter grade.
This course complements theories of urbanization and spatial development with an introduction to issues of governance within urban regions in the United States and Western Europe. The course discusses economic and political institutions and actors as they shape the spatial form of cities. The work of authors such as Patsy Healey, Margit Mayer, David Harvey, Mike Davis, and Susan Fainstein are discussed.

CRP 520 Statistical and Mathematical Concepts for Planning
Fall. 3 or 4 credits.
An introduction to statistical and mathematical concepts and methods of importance in planning and policy analysis. Topics include matrix algebra, probability, sampling, estimation, and regression, and the use of a microcomputer statistical package.

CRP 521 Mathematical Foundation for Planning Analysis.
Fall. 1 credit. S-U grades only. Meets for two hours, once each week, for approximately half the semester.
Review of mathematical foundations for planning analysis. Topics include probability statistics, mathematical functions, and matrix algebra. Intended for students with prior course work as a refresher course in preparation for higher-level courses in planning analysis. Departmental permission required.

CRP 525 Introductory Methods of Planning Analysis
Fall. 4 credits. Letter grade.
A course on quantitative and qualitative analysis of neighborhoods, cities, and regions. Focus is on data from various regions of the United States, but tools are applicable throughout the world. They include: descriptive and inferential statistics, mapping, and observation. Required lab exposes students to essential microcomputer applications and builds skills in writing and analysis.

CRP 529 Mathematics for Planners
Fall. 4 credits variable. S-U grades optional.
The course covers basic mathematical concepts and techniques—with an emphasis on calculus—needed by the student who wishes to take intermediate-level courses in economics, urban and regional analysis, quantitative methods for the social sciences, and policy analysis. Topics include: matrix algebra, set theory, functions, differentiation, and integration.

CRP 532 Real Estate Development Process
Fall. 3 credits.
Examination of various forms of development as well as the role of major participants in the processes. Reviews issues in residential, retail, industrial, office, and low-income housing projects. Guest speakers and case studies included.

CRP 533 Real Estate Marketing and Management
Fall. 3 credits.
The course focuses on the tenant or user as the basic source of the value of real estate. Students explore the characteristics and needs of tenants, and how the ownership and management of buildings respond to these needs. Office buildings are considered in detail while key elements common to the operation and marketing of all types of property are reviewed. Topics include examination of tenant types, factors creating preferred locations, building services and operations, negotiation of lease agreements, marketing campaigns, and governmental regulations. Guest speakers and case studies included.

CRP 537 Real Estate Seminar Series
Fall and spring. 1/2 credit per term. S-U grades only. Restricted to MPS/RE students.
A one-credit course designed to bring students weekly into direct contact with real estate professionals mainly through the use of

videoconferences originating from locations around the world.

CRP 543 Emerging Global Environmental Trends (also CRP 443)
Spring. 3 credits. Letter grade. Limited to 20 students.
For description, see CRP 443.

CRP 544 Resource Management and Environmental Law (also CRP 444)
Spring. 4 credits. Letter grade.
For description, see CRP 444.

CRP 545 Introduction to Quantitative Methods for the Analysis of Public Policy (also CRP 321)
Spring. 3 credits.
For description, see CRP 321.

CRP 546 Introduction to Community and Environmental Dispute Resolution
Fall. 3 credits.
This course explores the theories and techniques of dispute resolution as they apply to community, environmental, and related public policy disputes. Analysis complements skill-building. Issues of power, participation, and strategy are central to our examinations of negotiation and mediation practice.

CRP 547 American Indians, Planners, and Public Policy (also CRP 363 and LA 263/LA 547)
Spring. 3 credits.
For description, see LA 263.

CRP 548 Social Policy and Social Welfare (also CRP 448)
Spring. 4 credits.
For description, see CRP 448.

CRP 549 Ethics and Practical Judgment in Planning
Spring. 4 credits variable.
An introduction to problems of practical judgment and ethics as they arise in planning and public-serving professional practice. Issues such as consent, interests, deliberation, and legitimacy are central concerns.

CRP 551 Environmental Law (also CRP 451)
Fall. 4 credits.
For description, see CRP 451.

CRP 552 Urban Land-Use Planning I
Fall. 3 credits.
Surveys, analyses, and plan-making techniques for guiding physical development of urban areas; location requirements, space needs, and interrelations of land uses. Emphasis is on residential, commercial, and industrial activities and community facilities, and housing and neighborhood conditions. Lectures, seminars, and field exercises.

CRP 553 Urban Land-Use Planning II
Spring. 3 credits. Prerequisite: CRP 552 or permission of instructor.
Seminar covering the essentials of growth management, zoning, and subdivision, and the main tools for implementing a land-use plan. Covers agriculture and open space preservation, infrastructure timing controls, redevelopment, planned unit development, and much more.

CRP 555 Urban Systems Studio (also LA 701)
Fall. 5 credits. Prerequisite: permission of instructor.
Application of urban design and town planning techniques to specific contemporary problems of city environments. Issues of urbanism are investigated and applied to physical design interventions involving the street, square, block, garden, and park systems. Topics covered in the studio include urban land-use development, spatial systems and aesthetics, and public and private implementation of urban-design plans. Computer modeling and digital design media are introduced as tools for urban design. This is a specially arranged collaborative studio with the Landscape Architecture Program.

CRP 557 City Planning Design Studio
Spring. 4 credits. Prerequisite: previous design courses or permission of instructor.
A series of individual and team small area design projects at district, neighborhood, and project scale. The course objective is to develop an understanding of the spatial issues, knowledge, and skills needed to design for the functional, aesthetic, social, and cost needs of urban communities. Studio projects, field trips, and reading.

CRP 558 City and Regional Planning Workshop
Fall and spring. 4 credits. S-U grades only.
Students work on urban issues, such as housing, traffic and parking, economic development, zoning, and related planning issues with public or non-profit organizations in New York State. Projects are undertaken on a community-service basis for "clients" who specifically request planning assistance. Students work individually or in teams.

CRP 560 Documentation for Preservation (also ARCH 586)
Fall or spring. 3 credits.
Methods of identifying, recording, collecting, processing, and analyzing information dealing with historic and architecturally significant structures, sites, and objects.

CRP 561 Historic Preservation Planning Workshop: Surveys and Analyses (also ARCH 588)
Fall or spring. 4 credits.
Course covers: techniques for the preparation of surveys of historic structures and districts; identification of American architectural styles, focusing on upstate New York; and explorations of local historical resources, funding sources, and organizational structures. Lectures and training sessions. Emphasis on fieldwork with individuals and community organizations.

CRP 562 Perspectives on Preservation (also ARCH 585)
Fall. 3 credits.
Introductory course for preservationists. A survey of the historical development of preservation activity in Europe and America leading to a contemporary comparative overview. Field trips to notable sites and districts.

CRP 563 Problems in Contemporary Preservation Practice (also ARCH 584)
Spring. Variable credit.
A review and critique of ongoing preservation projects and an investigation of areas of expertise currently being developed. Presented by staff and guest lecturers.

CRP 564 Building Materials Conservation (also ARCH 587)
Spring. 3 credits. Open to juniors, seniors, and graduate students.
A survey of the development of building materials in the United States, chiefly during the nineteenth and early twentieth centuries, and a review of the measures that might be taken to conserve them.

CRP 565 Fieldwork or Workshop in History and Preservation
Fall or spring. Variable credit.
Work on applied problems in history and preservation planning in a field or laboratory setting or both.

CRP 567 Measured Drawing (also ARCH 583)
Fall. 3 credits. For undergraduate architecture students and graduate students in history and preservation. Prerequisite: permission of instructor.
Combines study of architectural drawing as historical documents with exercises in preparing measured drawings of small buildings. Presents the basic techniques of studying, sketching, and measuring a building and the preparation of a finished drawing for publication.

[CRP 569 Archaeology in Preservation Planning and Site Design (also LA 569)
Spring. 3 credits. Not offered 2001–2002.
For description, see LA 569.]

CRP 581 Principles of Spatial Design and Aesthetics (also CRP 381)
Fall. 3 credits. Prerequisite: special permission of instructor. Limited to 30 students.
For description, see CRP 381.

CRP 605 Urban Public Finance
Fall. 4 credits. Letter grade. Prerequisite: prior exposure to microeconomics.
An overview of neoclassical public economics theory, particularly those aspects of the theory that are central to urban public finance. The unusual three-tiered fiscal system of the United States is described along with the evolving fiscal and economic role of large municipal governments. Also presented is the public finance theory of taxation. Major taxes and other revenue sources used by large municipalities are described and analyzed. The heart of the matter is the measurement and analysis of the fiscal condition of cities.

[CRP 607 GIS Applications Workshop
Spring. 3 credits. Letter grade. Prerequisites: a basic GIS course and knowledge of ArcView or ArcInfo. Students with exceptional programming and web design skills can take the class with permission of instructor. Not offered 2001–2002.
This course is an advanced GIS class that focuses upon GIS applications and projects for one or more clients. Clients may be out-of-state so travel for meetings and/or site visits for data collection may be required. Contact the instructor directly to learn about project options for the current semester.]

CRP 612 Devolution and Public Sector Restructuring (also CRP 412)
Fall. 3 credits S-U grades optional.
For description, see CRP 412.

CRP 614 Gender and International Development (also WOMNS 614)
Spring. 3 credits.
This course has four main objectives: (1) to provide an analysis of the location of women in processes of development and to understand the centrality of gender in each case; (2) to examine theoretical and conceptual frameworks for the analysis, including an understanding of gender divisions and their

interaction with other forms of inequality such as class, race, and ethnicity; (3) to reflect upon the linkages between the global economy and the gendered macro and micro processes of development; and (4) to provide a basis for research, practical action, and policy formulation and for evaluating directions and strategies for social change.

CRP 616 Globalization and Development
Spring. 3 credits. Letter grade only.
This course concentrates on the current dynamics of national and international development, the globalization of national economies, and the forces and trends that are shaping this process. Beginning with an analysis of economic restructuring taking place since the late 1960s, the emphasis is on the factors affecting the new international division of labor and production, the labor market, consumption, trade and finance, and the distribution of resources. This includes the analysis of processes through which the current neoliberal model is being built, such as: trade liberalization, labor market flexibility, the erosion of nation states as economic units, and the formation of trade blocks and global institutions.

CRP 618 Local Government Workshop (also CRP 418)
Spring. 4 credits. S-U grade optional.
Prerequisite: CRP 412/612.
For description, see CRP 418.

CRP 621 Quantitative Techniques for Policy Analysis and Program Management
Spring. 4 credits.
Selected analytical techniques used in the planning and evaluation of public policy and public investments are examined. Topics include simulation modeling, benefit-cost and cost-effectiveness analysis (including capital budgeting), and optimization strategies.

CRP 631 Local Economic Policy—Field Workshop
Fall. 4 credits.
A group policy analysis exercise in a city in upstate New York. Students do a combination of data analysis, interviews with labor, business, and public leaders, and problem papers addressed to current issues presented by a client group. Individual work is synthesized into a comprehensive report at the end of the semester.

CRP 632 Methods of Regional Science and Planning I
Spring. 4 credits variable.
An introduction to some of the major methods and models used in regional science and planning. This course is half of a two-semester sequence (see CRP 731). Either course may be taken first. Both courses cover topics related to the structure and assumptions of the models, model development, and their applications in regional science and planning. Where appropriate, computer implementation are considered. CRP 730 emphasizes statistical and econometric models.

[CRP 633 Methods of Regional Science and Planning II
Fall. 4 credits. Not offered 2001–2002.
See CRP 632. CRP 633 will provide an introduction to deterministic methods and models such as input/output models, social accounting models, and optimization models.]

CRP 635 Workshop: State Economic Development Strategies
Spring. 4 credits. S-U grades optional.
The purpose of this workshop is twofold: (1) to provide students with research tools useful in developing state-level economic development strategies; and (2) to provide a critical understanding of the primary economic development strategy used by U.S. state policymakers: firm specific subsidies. The course consists of lecture and discussion meetings. The workshop sessions include exercises in qualitative information gathering on economic development topics; use of the census in combination with geographic information systems for analysis and presentation; and shift-share analysis.

CRP 639.05 Special Topic: Regional Development, Planning, and the Market, with Emphasis on the Third World-I: Historical and Theoretical Perspective
Fall. 4 credits variable.
Historical and conceptual background, and relevant case material, for dealing with urban and regional development using production analysis with a focus on the Third World. Consequences of the organization of production for urban-rural and regional interactions are emphasized. This historically oriented theoretical framework is compared to location, central place, and interregional feedback theories.

CRP 639.06 Special Topic: Regional Development, Planning, and the Market, with Emphasis on the Third World-II: Current Policy Perspective
Spring. 4 credits variable.
The course focuses on what the market can or cannot accomplish in terms of guiding economic industrial, and regional development. Points of view represented range from completely unrestricted market operations to proactive industrial development policies in market contexts. Lessons are devised for Third World regional development policy drawn from the experience.

CRP 642 Critical Theory and the Micro-Politics of Practice
Spring. 4 credits variable.
In trying to solve problems, planners and policy analysts set agendas, shape participation, and negotiate relations of power. This seminar explores theories illuminating the communicative micro-politics of their daily practice. Issues of power and discourse, practical judgment and deliberation, productive and reproductive aspects of prosmatic, political speech, and action in diverse practical settings are explored.

CRP 653 Legal Aspects of Land-Use Planning
Spring. 3 credits. Not offered every year.
Survey of leading cases and legal concepts in land-use planning, with particular attention to zoning, subdivision control, condemnation, and growth-control issues.

CRP 655 Real Estate Project Workshop
Spring. 4 credits. Permission of instructor required.
Students are asked to undertake the preparation of reports analyzing various aspects of real estate activity. Individual and team working relationships are required. A range of types of problems that may be encountered in the real estate field are addressed, including project feasibility, marketing, planning and design, legal constraints and concerns, and others. Projects focus on real world case studies and require professional level reports suitable for oral and written presentations.

CRP 657 Real Estate Law
Fall. 3 credits. Letter grade.
Examination of major legal concepts pertaining to acquisition, use, management, and transfer of real estate. Particular focus is on important legal considerations pertaining to property rights, contracts, and public controls on the use of land. Consideration of important case law, statutory law, and rules and regulations. Current legal issues affecting the real estate industry are discussed.

CRP 658 Residential Development
Spring. 3 credits. Letter grade.
The course explores the residential development process from site acquisition through delivery and servicing of the finished product. Topics covered include: market feasibility, land planning and acquisition, product selection and design considerations, project financing and feasibility, schedule and budgetary controls, contracting and constructions issues, marketing and sales activities, and customer service. Current issues in providing competitive housing products in today's markets are also explored. Composition of the residential development project team is discussed, and classes are supplemented by presentations from visiting professionals as well as at least one visit to an actual project.

CRP 661 Historic Preservation Planning Workshop: Plans and Programs
Fall or spring. 1–4 credits. Prerequisite: CRP 561.
Preparation of elements of historic preservation plans, designs, legislation, and special studies. Individual or group projects are selected by students. Fieldwork is emphasized.

CRP 662 Seminar in American Urban History (also CRP 361)
Fall or spring. 3 credits. Prerequisite: permission of instructor.
For description, see CRP 361.

CRP 663 Historic Preservation Law
Spring. 3 credits. Offered alternate years.
The course covers: law of historic district and landmark designation; tools for preservation (such as police power, taxation, eminent domain); and recent developments in state and federal historic preservation.

CRP 664 Economics and Financing of Neighborhood Conservation and Preservation
Spring. 3 credits.
The economic and financial aspects of historic preservation and neighborhood conservation. Topics include public finance, selected issues in urban economics, real estate economics, and private financing of real estate projects.

CRP 665 Preservation Planning and Urban Change
Fall. 3 credits.
An examination of fundamental planning concepts and issues as they relate to historic preservation. Neighborhood revitalization, federal housing programs, the role of public and private institutions, displacement, and other social issues are among the primary topics.

[CRP 666 Pre-Industrial Cities and Towns of North American (also LA 666)
Fall. 3 credits. S-U grades optional. Not offered 2001–2002.
For description, see LA 666.]

CRP 669.40 The History of Urban Form in America (also CRP 395.40)
Fall. 3 credits.
For description, see CRP 395.40.

CRP 670 Regional Planning and Development in Developing Nations
Fall or spring. 4 credits. Prerequisite: second-year graduate standing.
Extensive case studies of development planning are analyzed. Focus is on the political economy of the process of regional development through urbanization and in particular on the concepts of equity and efficiency, external economies, export linkages, and internal self-sufficiency and integration. Resource development, national integration, human development, and migration problems are discussed.

CRP 671 Seminar in International Planning
Spring. 1 credit. S-U grades only.
The international planning lecture series sponsors lectures by visiting scholars or professionals in the field of international development and planning. The only formal requirement for the course is a brief evaluation of the series at the end of the semester.

CRP 672 International Institutions
Fall. 3 credits. Letter grade.
Study of major international organizations of the post-WWII period like the UN, ILO, GATT-WTO, World Bank and IMF, and Bretton Woods. The course covers how they functioned during and after the globalizing international economy. The weaknesses in global governance and in the international financial system are explored, and current debates and proposals for reform are assessed.

CRP 674 Third World Urbanization (also CRP 474)
Spring. 4 credits. S-U grades optional.
For description, see CRP 474.

CRP 675 Seminar in Project Planning in Developing Countries
Fall. 4 credits.
An examination of the problems and issues involved in preparing project proposals for presentation to funding agencies. Topics include technical design, financial feasibility, social impact analysis, and policy relevance, as well as techniques for effective presentation of proposals. The course is organized as a seminar-workshop providing both an analysis of the critical elements of effective proposals and an opportunity to use those elements in the preparation of proposals. A multidisciplinary perspective is emphasized.

CRP 677 Issues in African Development (also CRP 477)
Fall or spring. 1 credit. S-U only.
For description, see CRP 477.

CRP 679.03 Wilderness and Wildlands: Issues in Policy and Planning (also CRP 395.03)
Fall. 2–3 credits variable. Graduate seminar open to juniors and seniors. Not offered every year.
For description, see CRP 395.03.

CRP 683 Environmental Aspects of International Planning (also CRP 453)
Fall. 3 credits.
For description, see CRP 453.

CRP 703 Contemporary Theories of Regional Development
Fall or spring. 4 credits.
An advanced seminar, mainly for doctoral candidates, to review recent contributions to the literature. After a fast-paced review of basic material in political economy, students read and present summaries of works by major contemporary theorists. A final paper is required.

CRP 711 Planning and Organization Theory
Fall or spring. 4 credits.
Advanced seminar on theoretical models of planning, organization, and urban structure. The first part of the course, which may be taken separately for one credit, provides an overview of administrative issues affecting planning. Next, attention is given to theories of organizational structure, growth, and change. Final sessions are devoted to the influence of urban and regional structures as context. Critical reading, short papers, and seminar discussion characterize the course.

CRP 732 Methods of Regional Science and Planning III
Fall or spring. 3 credits. Prerequisites: CRP 632 and CRP 633 or permission of the instructor.
An introduction to the design and implementation of Social Accounting Matrix and Computable General Equilibrium models and their uses, primarily in a regional context, for planning and policy analysis. The use of econometric methods and CGE models are discussed. The GAMS software package is used in related computer exercises.

CRP 733 Seminar in Regional Models
Fall or spring. 3 credits. S-U grades optional. Prerequisites: sufficient methodological background to read the current literature.
A review of the classical and important current literature on socioeconomic and/or environmental models of subnational regions. Each student is expected to identify his or her own area of interest and critically review and report to the class on important papers in that area.

CRP 790 Professional Planning Colloquium I
Fall. 1 credit.
Visiting lecturers address problems and opportunities in the practice of planning. Topical focus to be announced. The only formal requirements for the course are attendance and a brief evaluation at the semester's end.

CRP 791 Master's Thesis in Regional Science
Fall or spring. 12 credits variable. S-U grades optional. Hours to be arranged. Regional Science faculty.

CRP 792 Master's Thesis, Project, or Research Paper
Fall or spring. 10 credits variable. S-U grades optional.

CRP 794 Planning Internships
Fall, spring, or summer. 1–12 credits variable.
Combines a professional planning internship in a metropolitan area with academic study to provide experience and understanding of the planner's role in formulating and implementing plans and policies. Salaried internships in federal or state agencies, legislative offices, and comparable settings include development of research, analysis, and other technical skills. Weekly seminars draw on student field experiences, assigned readings, and guest speakers to examine current issues of federal, urban, and regional policy from the perspective of planning practice.

CRP 795 Master's Thesis in Preservation Planning
Fall or spring. 1–6 credits variable.

CRP 796 Professional Writing and Publishing (Colloqui)
Fall or spring. 2 credits. S-U grades only.
Individual and group projects culminating in the production of a professional journal.

CRP 797 Supervised Readings
Fall or spring. 4 credits variable. Limited to graduate students. Prerequisites: permission of instructor.
For description, see department coordinator, 106 West Sibley.

CRP 798 Colloquium in Regional Science, Planning, and Policy Analysis
Fall or spring. 1 credit.
Presentation and discussion of current research by faculty, visitors, and graduate students working on their dissertations. Typically, the colloquium meets once a week during the semester.

CRP 800 Advanced Seminar in Urban and Regional Theory I
Fall. 3 credits.
The theory of urban spatial organization. Economic, technological, and social factors leading to urbanization and various kinds of spatial organizations are explored. Major theoretical contributions to the understanding of intraregional and intraurban distribution of population and economic activity are reviewed.

CRP 801 Advanced Seminar in Urban and Regional Theory II
Spring. 3 credits.
A continuation of City and Regional Planning 800, concentrating on recent developments.

CRP 810 Advanced Planning Theory
Fall. 3 credits.
A survey of the works of scholars who have contributed to current thinking about planning theory. Alternative assumptions concerning models of man and theoretical concepts concerning the nature of planning today are considered.

CRP 830 Seminar in Regional Science, Planning, and Policy Analysis
Fall or spring. 4 credits variable. S-U grades only.
This seminar provides an opportunity to review some of the literature and current research in regional science, planning, and policy analysis. Specific topics covered vary each year. Empirical and analytical research are emphasized. Students are expected to prepare and present a research paper during the semester on some aspect of the topics under review.

CRP 890 Planning Research Seminar I
Fall or spring. 2 credits.

Intended for doctoral candidates in city and regional planning; other students welcome. Presentation and discussion of current problem areas and research by advanced doctoral students, faculty members, and visitors.

CRP 892 Doctoral Dissertation
Fall or spring. 1–2 credits variable.

Special Topic Courses
Fall or spring. Variable credit.
Typical topics are:

CRP 609 Urban and Regional Theory

CRP 619 Planning Theory and Politics

CRP 629 Quantitative Methods and Analysis

CRP 639 Regional Development Planning

CRP 649 Social-Policy Planning

CRP 659 Urban Development Planning

CRP 669 History and Preservation

CRP 679 Planning and Developing Regions

CRP 689 Environmental Planning

CRP 699 Regional Science

CRP 719 Planning Theory and Politics

LANDSCAPE ARCHITECTURE

Landscape Architecture at Cornell is jointly sponsored by the College of Agriculture and Life Sciences and the College of Architecture, Art, and Planning.

The Program

Program faculty: M. I. Adleman, S. Baugher, K. L. Gleason, H. Gottfried, chair; P. Horrigan, R. Jaenson, D. W. Krall, L. J. Mirin, R. T. Trancik, P. J. Trowbridge, K. A. Wolf.

Landscape Architecture offers a three-year Master of Landscape Architecture License Qualifying Degree, administered through the Graduate School, for those who have a four-year undergraduate degree in another field. The major is composed of several parts: core courses related to professional education in Landscape Architecture; a concentration in a subject related to the core courses; and free electives. Requirements of the three-year M.L.A. curriculum include 90 credits, and six resident units, satisfactory completion of the core curriculum courses, and a thesis or a capstone studio.

The department also offers a two-year Master of Landscape Architecture Advanced Degree Program, administered through the Graduate School, for those with accredited degrees in Landscape Architecture or Architecture. The two-year program entails core courses in the discipline and the development of concentrations in subject matter areas such as landscape history and theory, landscape ecology and urban horticulture, the cultural landscape, site/landscape and art, or urban design.

Both of these degrees are accredited by the Landscape Architecture Accreditation Board (LAAB) of the American Society of Landscape Architects.

Dual Degree Options

Graduate students can earn a Master of Landscape Architecture and a Master of Science (Horticulture) or a Master of City and Regional Planning simultaneously. Students need to be accepted into both fields of study to engage in a dual degree program and must fulfill requirements of both fields of study. Thesis requirements are generally integrated for dual degrees.

Course Information

Note: All of the following courses are offered through the College of Agriculture and Life Sciences except LANAR 497, 524, and 525.

LA 141 Grounding in Landscape Architecture
Fall. 4 credits.

LA 142 Grounding in Landscape Architecture
Spring. 4 credits.

LA 201 Medium of the Landscape
Fall. 5 credits.

LA 202 Medium of the Landscape
Spring. 5 credits.

[LA 260 Pre-Industrial Cities and Towns of North America (also CRP 360, CRP 666 and LA 666)
Fall. 3 credits. Not offered 2001–2002.]

LA 261 Fieldwork in Urban Archaeology (also CRP 261)
Fall. 3 credits.

LA 262 Laboratory in Landscape Archaeology (also ARKEO 262)
Fall. 3 credits.

LA 263 American Indians, Planners, and Public Policy (also CRP 363/547 and LA 547)
Spring. 3 credits.

LA 282 The American Landscape
Fall. 3 credits.

LA 292 Creating a Second Nature
Spring. 3 credits.

LA 301 Integrating Theory and Practice I
Fall. 5 credits.

LA 302 Urban Design in Virtual Space
Spring. 5 credits.

LA 315 Site Engineering I
Spring. 3 credits.

LA 316 Site Engineering II
Fall. 2 credits.

LA 318 Site Construction
Spring. 5 credits.

LA 402 Integrating Theory and Practice
Spring. 5 credits.

LA 410 Computer Applications in Landscape Architecture
Fall or spring. 3 credits.

LA 412 Professional Practice
Spring. 1 credit.

LA 483 Design Criticism
Fall. 3 credits.

LA 486 Placemaking by Design: Theory Seminar
Spring. 3 credits.

[LA 487 Experiential Community Design
Fall. 3 credits. Not offered 2001–2002.]

LA 490 Rome Wasn't Built in a Day
Spring. 3 credits.

LA 491 Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment (also HORT 491)
Fall. 4 credits.

LA 492 Creating the Urban Eden: Woody Plant Selection, Design, and Landscape Establishment
Spring. 4 credits.

LA 494 Special Topics in Landscape Architecture
Fall or spring. 1–3 credits.

LANAR 497 Individual Study in Landscape Architecture
Spring. 1–5 credits; may be repeated for credit. S-U grades optional. L. J. Mirin.
Work on special topics by individuals or small groups.

LA 498 Undergraduate Teaching
Fall or spring. 1–2 credits.

LA 501 Composition and Theory
Fall. 5 credits.

LA 502 Composition and Theory
Spring. 5 credits.

LA 505 Graphic Communication I
Fall. 3 credits.

LA 506 Graphic Communication II
Spring. 3 credits.

LANAR 524 History of European Landscape Architecture
Fall. 3 credits. L. Mirin.
A survey from classical times to the present, emphasizing design principles and techniques that have established the landscape architecture tradition in Europe. Particular reference is made to the manner in which gardens, streets, plazas, parks, and new towns reflect in their built form, a range of responses to demands of culture, economics, technology, security, the law, and ecology.

LANAR 525 History of American Landscape Architecture
Spring. 3 credits. L. Mirin.
Landscape architecture in the United States from Jefferson to the present is examined as a unique expression of the American experience. Influences exerted by the physical landscape, the frontier and utopian spirit, and the cultural assumptions of democracy and capitalism are traced as they affect the forms of urban parks, private and corporate estates, public housing, transportation planning, national parks, and other open-space designs.

LA 545 The Parks and Fora of Imperial Rome
Spring. 3 credits.

LA 547 Americans, Indians, Planners, and Public Policy (also CRP 363/547 and LA 263)
Spring. 3 credits.

[LA 569 Archaeology in Preservation Planning and Site Design (also CRP 569)
Spring. 3 credits. Not offered 2001–2002.]

LA 582 The American Landscape
Fall. 3 credits.

LA 590 Theory Seminar
Spring. 3 credits.

LA 598 Graduate Teaching
Fall or spring. 1–2 credits.

LA 601 Integrating Theory and Practice I
Fall. 5 credits. Limited to graduate students.

LA 602 Integrating Theory and Practice II
Spring. 5 credits. Limited to graduate students.

LA 615 Site Engineering I
Spring. 3 credits.

LA 616 Site Engineering II
Fall. 2 credits.

LA 618 Site Construction
Spring. 5 credits. Weeks 8–15.

[LA 619 Advanced Site Grading
Spring. 2 credits. Not offered 2001–2002.]

[LA 666 Pre-Industrial Cities and Towns of North America (also CRP 360/666 and LA 260)
Fall. 3 credits. Not offered 2001–2002.]

LA 680 Graduate Seminar in Landscape Architecture
Fall or spring. 1–3 credits.

LA 694 Special Topics in Landscape Architecture
Fall or spring. 1–3 credits.

LA 701 Urban Design and Planning: Designing Cities in the Electronic Age (also CRP 555)
Fall. 5 credits.

LA 702 Advanced Design Studio
Spring. 5 credits.

LA 800 Master's Thesis in Landscape Architecture
Fall or spring. 9 credits.

FACULTY ROSTER

Azis, Iwan, Ph.D., Cornell U. Visiting Prof., City and Regional Planning.
Baugher, Sherene, Ph.D., SUNY at Stony Brook. Visiting Prof., City and Regional Planning
Benería, Lourdes, Ph.D., Columbia U. Prof., City and Regional Planning
Bertoia, Roberto, M.F.A., Southern Illinois U. Assoc. Prof., Art
Blum, Zevi, B.Arch., Cornell U. Assoc. Prof., Art
Booth, Richard S., J.D., George Washington U. Assoc. Prof., City and Regional Planning
Bowman, Stanley J., M.F.A., U. of New Mexico. Prof. Emeritus, Art
Briggs, Laura, M. Arch., Columbia U. Asst. Prof., Architecture
Chi, Lily H., M. Phil., Cambridge U. Asst. Prof., Architecture
Christopherson, Susan M., Ph.D., U. of California at Berkeley. Asst. Prof., City and Regional Planning
Clavel, Pierre, Ph.D., Cornell U. Prof., City and Regional Planning
Colby, Victor E., M.F.A., Cornell U. Prof. Emeritus, Art
Crump, Ralph W., B.Arch., Cornell U. Prof. Emeritus, Architecture
Cruvellier, Mark R., M. Eng., Ph.D., McGill U. (Canada). Assoc. Prof., Architecture
Curry, Milton S. F., M. Arch., Harvard U. Asst. Prof., Architecture
Czamanski, Stan, Ph.D., U. of Pennsylvania. Prof. Emeritus, City and Regional Planning
Daly, Norman, M.A., Ohio State U. Prof. Emeritus, Art
Davis, Felecia, M. Arch., Princeton U. Asst. Prof., Architecture
Drennan, Matthew P., Ph.D., New York University. Prof., City and Regional Planning
Esnard, Ann-Margaret, Ph.D., U of Massachusetts-Amherst. Prof., City and Regional Planning
Evett, Kenneth W., M.A., Colorado Coll. Prof. Emeritus, Art
Forester, John, Ph.D., U. of California at Berkeley. Prof., City and Regional Planning
Goehner, Werner H., Dipl. Ing., Technical U. Karlsruhe (Germany), M.Arch., Cornell U. Prof., Architecture
Goldsmith, William W., Ph.D., Cornell U. Prof., City and Regional Planning
Greenberg, Donald P., Ph.D., Cornell U. Prof., Architecture
Hascup, George E., B.Arch., U. of California at Berkeley. Prof., Architecture
Hodgden, Lee F., M.Arch., Massachusetts Inst. of Technology. Prof. Emeritus, Architecture
Hubbell, Kent L., M.F.A.S., Yale. Prof., Architecture
Isard, Walter, Ph.D., Harvard U. Prof. Emeritus, City and Regional Planning
Kira, Alexander, M.R.P., Cornell U. Prof. Emeritus, Architecture
Kord, Victor, M.F.A., Yale U. Prof., Art
Lasansky, D. Medina, Ph.D., Brown U. Asst. Prof., Architecture
Lewis, David B., Ph.D., Cornell U. Assoc. Prof., City and Regional Planning
Lewis, David J., M.Arch., Princeton U. Asst. Prof., Architecture
Lobo, Jose, Ph.D., Cornell U. Prof., City and Regional Planning
Locey, Jean N., M.F.A., Ohio U. Prof., Art
Lynch, Barbara, Ph.D., Cornell U. Visiting Assoc. Prof., City and Regional Planning
Lyons, Marcia, M.F.A., School of Visual Arts. Asst. Prof., Art
MacDougall, Bonnie G., Ph.D, Cornell U. Assoc. Prof., Architecture
Mackenzie, Archie B., M.Arch., U. of California at Berkeley. Assoc. Prof., Architecture
McGrain, Todd V., MFA, U. of Wisconsin. Asst. Prof., Art
Meyer, Elisabeth H., M.F.A., U. of Texas. Assoc. Prof., Art
Mikus, Eleanore, M.A., U. of Denver. Prof. Emeritus, Art
Miller, John C., M.Arch., Cornell U. Prof., Architecture
Mirin, Leonard J., M.L.A., U. of Michigan. Assoc. Prof., Landscape Architecture
Mulcahy, Vincent J., M.Arch., Harvard U. Assoc. Prof., Architecture
Ochshorn, Jonathan, M. Urban Design, City College of New York. Assoc. Prof., Architecture
Olpadwala, Porus, Ph.D., Cornell U. Assoc. Prof., City and Regional Planning
Otto, Christian F., Ph.D., Columbia U. Prof., Architecture
Ovaska, Arthur, M.Arch., Cornell U. Assoc. Prof., Architecture
Page, Gregory, M.F.A., U. of Wisconsin. Assoc. Prof., Art
Pearman, Charles W., B.Arch., U. of Michigan. Prof., Architecture
Pendall, Rolf, Ph.D., U. of California at Berkeley. Prof., City and Regional Planning
Perlus, Barry A., M.F.A., Ohio U. Assoc. Prof., Art
Poleskie, Stephen F., B.S., Wilkes Coll. Prof. Emeritus, Art
Reardon, Kenneth, Ph.D., Cornell U. Assoc. Prof., City and Regional Planning
Reps, John W., M.R.P., Cornell U. Prof. Emeritus, City and Regional Planning
Richardson, Henry W., M.R.P., Cornell U. Prof., Architecture
Saltzman, Sid, Ph.D., Cornell U. Prof., City and Regional Planning
Saul, Francis W., M.S., Harvard U. Assoc. Prof. Emeritus, Architecture
Schack, Mario L., M.Arch., Harvard U. Arthur L. and Isabel B. Wiesenberger Prof., Architecture
Shaw, John P., M.Arch., Massachusetts Inst. of Technology. Prof. Emeritus, Architecture
Simitch, Andrea, B.Arch., Cornell U. Assoc. Prof., Architecture
Singer, Arnold, Prof. Emeritus, Art
Squier, Jack L., M.F.A., Cornell U. Prof., Art
Stein, Stuart W., M.C.P., Massachusetts Inst. of Technology. Prof. Emeritus, City and Regional Planning
Taft, W. Stanley, M.F.A, California College of Arts and Crafts. Assoc. Prof., Art
Tomlan, Michael A., Ph.D, Cornell U. Asst. Prof., City and Regional Planning
Trancik, Roger T., M.L.A.-U.D., Harvard U. Prof., Landscape Architecture/City and Regional Planning
Ungers, O. Mathias, Diploma, Technical U. Karlsruhe (Germany). Prof. Emeritus, Architecture
Vietorisz, Thomas, Ph.D., Massachusetts Inst. of Technology. Adjunct Prof., City and Regional Planning
WalkingStick, Kay, M.F.A., Pratt Institute. Prof., Art
Warke, Val K., M.Arch., Harvard U. Assoc. Prof., Architecture
Warner, Mildred, Ph.D., Cornell U. Prof., City and Regional Planning
Wells, Jerry A., B.Arch., U. of Texas. Prof., Architecture
Woods, Mary N., Ph.D., Columbia U. Assoc. Prof., Architecture
Zissovici, John, M.Arch., Cornell U., Assoc. Prof., Architecture

BIOLOGICAL SCIENCES

The biology major provides a unified curriculum for undergraduates enrolled in either the College of Agriculture and Life Sciences or the College of Arts and Sciences. Courses in biological sciences are integral to many disciplines and are basic requirements in many schools and colleges at Cornell.

Graduate study in the biological sciences is administered by more than a dozen specialized fields within the Graduate School, as described in the Announcement of the Graduate School.

ORGANIZATION

Many different departments participate in the biology major.

Student services are provided by the Office of Undergraduate Biology (OUB), www.bio.cornell.edu, which includes the Behrman Biology Advising Center. Co-located in Stimson Hall, the professional and student advisers provide academic and career advising, as well as help undergraduates find research opportunities on campus. Advisers in the OUB also follow the progress of biology majors and work closely with faculty advisers. Additional services and resources of the Biology Center include tutoring, lecture tapes, examination files, and extensive information on summer research opportunities and graduate programs. The center has comfortable areas for studying and relaxing.

The Shoals Marine Laboratory, a cooperative venture with the University of New Hampshire, is located on Appledore Island in the Gulf of Maine. Its base office in Stimson Hall provides academic and career advising for students interested in the marine sciences and administers the SEA Semester program for Cornell students pursuing studies at Woods Hole or aboard the schooner *Westward* or brigantine *Corwith Cramer*.

DISTRIBUTION REQUIREMENT

In the College of Agriculture and Life Sciences, the biological sciences distribution requirement (Group B) is a minimum of 9 credits, including at least 6 credits of introductory biology satisfied by Biological Sciences 109–110, 105–106, or 101 and 103 plus 102 and 104, or 107–108. Advanced placement in biology with a score of 4 or 5 (6 or 8 credits, respectively) satisfies the requirement for introductory biology. The additional credits may be satisfied by any biological sciences courses *except BIO G 200* (unless permission is obtained), *BIO G 209, or BIOSM 367*.

For students in the College of Arts and Sciences, all biology ("BIO") courses can be used toward fulfillment of the biological distribution requirement except *BIO G 200* (unless permission is obtained), *BIO G 209, or BIOSM 367*. The following courses are especially suitable for the distribution requirement because they have no prerequisites: BIO G 101–104, 105–106, 107–108, 109–110, 170, 202; BIOEE 154, 207, 264, 275; BIOGD 184; BIOMI 192; BIOAP 212; BIOPL 240, 241. *Note that introductory biology can only count for distribution credit when taken as a two-semester sequence: BIO G 109–110, 105–106, or 101 and 103 plus 102 and 104, or 107–108.* Advanced placement in biology with a score of 4 or 5 (6 or 8 credits, respectively) may be applied to the Group 1 distribution area in accordance with regulations stipulated by the Arts College.

In the College of Human Ecology, the natural sciences distribution requirement is for at least 6 credits selected from BIO G 109–110, 101 and 103 plus 102 and 104, 105–106 or 107–108 or from specified courses in chemistry or physics. Advanced placement in biology with a score of 4 or 5 (6 or 8 credits, respectively) also satisfies the distribution requirement in the natural sciences.

Switching from one introductory biology sequence to another at midyear may not be possible because of variation in presentation of topics. Students must receive permission of the instructor to switch sequences. Taking sequences in reverse order is strongly discouraged.

USE OF ANIMALS IN THE BIOLOGICAL SCIENCES CURRICULUM: CORNELL UNIVERSITY

Students wishing to enroll in biology ("BIO") courses should know and understand the following criteria relative to the use of animals in the teaching program, as passed by the faculty of the Division of Biological Sciences in 1988, and reaffirmed in 1997:

1. "Live animals will be used for teaching in certain courses in the biological sciences. Some animals will require humane euthanasia after they have been used for teaching.
2. Courses bearing the "BIO" description conform to the rules for the care of such animals as outlined in Guiding Principles in the Care and Use of Animals (as approved by the Council of the American Physiological Society), the Guide for the Care and Use of Laboratory Animals. (DHEW publication 86–23, revised 1996; see p. 14, *Courses of Study*), the Animal Welfare Act, and the New York State Public Health Law. Within these regulations, and in keeping with the principle of Academic Freedom of the Faculty, the use of animals to aid in teaching any biological sciences discipline is at the discretion of the professor in charge.
3. Each course, as well as research projects, in which animals are used receives a formal review annually by the Cornell University Institutional Animal Care and Use Committee (IACUC).
4. Any concerns regarding the use of live animals in teaching should be addressed first to the faculty member responsible for that course. He or she is required to be in compliance with all applicable regulations and guidelines. Alternatively, students may choose to address their concerns to the director of the Cornell Center for Research Animal Resources, Dr. Fred Quimby, at 253–3520. The director may initiate discussion with the faculty member responsible for a particular course without involving the student if he or she would prefer to remain anonymous.
5. Enrollees in those courses in the biological sciences in which animal use is a component may, at the professor's discretion, be asked to sign copies of this statement (USE OF ANIMALS...) at the first meeting of the course."

ADVANCED PLACEMENT

For information on credit for advanced placement in Biological Sciences, please see the section on Advanced Placement in the front of this publication.

THE MAJOR

The major of biological sciences is available to students enrolled in either the College of Agriculture and Life Sciences or the College of Arts and Sciences. The undergraduate program is coordinated for students in both colleges by the Office of Undergraduate Biology. By completion of the sophomore year, all students who intend to major in biological sciences must declare the major and a program of study through the Office of Undergraduate Biology, in 216 Stimson Hall.

Whenever possible, students should include the introductory biology, chemistry, and mathematics sequences in their freshman schedule and complete the organic chemistry lecture course in their sophomore year. Biology majors should regularly monitor their progress in the major, and should assess as realistically as possible the likelihood of achieving at a level that is consistent with their academic and personal goals. Weak performance in core courses, particularly after the freshman year, may indicate a need to re-evaluate aptitude and genuine interest in the major. Students with questions, particularly with concerns about their ability to complete the major, are encouraged to consult with their biology adviser, and to take advantage of the advising and counseling resources of the Office of Undergraduate Biology as well as those of the university and their college.

The requirements for the biological sciences major are listed below. Requirements 1–8

must be taken for a letter grade. Courses taken for the program of study should be taken for a letter grade unless the course is offered for S-U only or if the student's adviser grants permission.

1) **Introductory biology for majors** (one year): BIO G 101 and 103 plus 102 and 104, or 105–106. BIO G 107–108, offered during the eight-week Cornell Summer Session for eight credits, also satisfies the introductory biology requirement for majors. Students may choose to accept advanced placement credit if they have received a score of 5 on the Advanced Placement Examination of the College Entrance Examination Board (CEEB). Students with a score of 4 must fulfill the introductory biology requirement by taking BIO G 101–102, 101 and 103, 102 and 104, 103–104, or 105 or 106. These students should consult information available in the respective course offices and in the Office of Undergraduate Biology (216 Stimson Hall) to determine which semester to complete the introductory biology requirement. For students in doubt, completion of BIO G 101 and 103 is advised. These students receive a total of eight introductory biology credits (four AP credits plus four course credits).

2) **General chemistry** (one year): Chemistry 207–208,* or 206–208, or 215–216.*

3) **College mathematics** (one year): one semester of calculus (Mathematics 106, 111, 191 or their equivalent) plus one semester selected from the following:

   a. a second semester of calculus (Mathematics 112, 192, or their equivalents).

   b. a course in finite mathematics (Biometry 101, 417, Mathematics 105, 231).

   c. a course in statistics (Biometry 261, Mathematics 171, Agriculture and Resource Management 210, Psychology 350, Industrial and Labor Relations 210 and 211).

4) **Organic chemistry**: Chemistry 257 and 251, or 357–358 and 251, or 357–358 and 301, or 359–360 and 251, or 359–360 and 301.

5) **Physics:** Physics 207–208,* 112–213,* or 101–102. Those who take Physics 112–213 are advised to complete Physics 214 as well.

6) **Genetics:** BIOGD 281.

7) **Biochemistry:** BIOBM 330, or 331 and 332, or 333.

8) **Evolutionary Biology:** BIOEE 278 or BIOPL 448. Note: BIOPL 241, Botany, is a prerequisite course to BIOPL 448.

9) **A program of study** selected from the outline below.

10) **Foreign language:** students registered in the College of Agriculture and Life Sciences must satisfy the foreign language requirement for the biology major by (a) presenting evidence of successful completion of three or more years of study of a foreign language in high school or (b) achieving "qualification" status in a language as defined by the College of Arts and Sciences or (c) successfully completing at least six college credits in a foreign language. Students registered in the College of Arts and Sciences must satisfy the language requirement as stated by that college.

*Since modern biology has an important physical and quantitative orientation, students are advised to undertake basic science courses that emphasize this approach. Asterisks in the above list indicate the courses that provide this orientation, but all courses listed are acceptable.

Although not required for the biological sciences major, a course in statistics is recommended for students planning graduate study or a research career. Students should consult their faculty advisers when choosing appropriate courses in statistics.

Note: Core courses cannot count toward the Program of Study Requirements.

Programs of Study and Requirements

As noted in the list of requirements above, students accepted into the biological sciences major must choose a Program of Study. Whereas the core requirements of the biology curriculum provide the common foundation deemed essential for all biology majors, the role of the Program of Study is to provide either a concentration in a particular area of biology or, in the case of the General Biology Program of Study, a survey of biology that is broad but not superficial. The Program of Study requirement can be met by taking 13 to 15 credit hours of courses chosen by the student in consultation with his or her biology adviser. Programs of Study for particular subject areas are designed by faculty specializing in the subject. Typically, the Program of Study consists of one or more courses that provide foundation in the subject and a list of optional courses from that area or related areas, many of which are at an advanced level (300 or higher). Because biology is an experimental science, most Programs of Study require one or more laboratory courses. The laboratory requirement in some Programs of Study can be met by participation in the independent research course (BIO G 499). The possible Programs of Study and their requirements are listed below:

1) *Animal Physiology:* BIOAP 311 Introductory Animal Physiology, BIOAP 316 Cellular Physiology, plus a minimum of 7 credit hours selected from the following lecture and laboratory courses, of which at least 4 credit hours must be a laboratory course.

   a) Lecture courses: ABEN 454 Physiological Engineering; AN SC 300 Animal Reproduction and Development; AN SC 410 Nutritional Physiology and Metabolism; AN SC 427 Fundamentals of Endocrinology; BIO G 305 Basic Immunology; BIOAP 214 Biological Basis of Sex Differences; BIOAP 458 Mammalian Physiology; BIOBM 407 Nature of Sensing and Response: Signal Transduction in Biological Systems; BIOBM 437 Eukaryotic Cell Proliferation; BIOGD 385 Developmental Biology; BIOGD 483 Molecular Aspects of Development; BIONB 322 Hormones and Behavior; BIONB 325 Neurodiseases-Molecular Aspects; BIONB 326 The Visual System; BIONB 492 Sensory Function; NS 331 Physiological and Biochemical Bases of Human Nutrition.

   b) Laboratory courses: AN SC 301 Animal Reproduction and Development; BIO G 401 Introduction to Scanning Microscopy; BIO G 403 Transmission Electron Microscopy for Biologists; BIOAP 313 Histology: The Biology of the Tissues; BIOAP 319 Animal Physiology Laboratory; BIOBM 440 Experimental Molecular Biology; BIOBM 441Experimental Proteins and Enzymology; BIOBM 442 Experimental Cell Biology; BIOBM 443 Experimental Molecular Neurobiology; BIONB 491 Principles of Neurophysiology.

2) *Biochemistry:* Chemistry 300, Quantitative Chemistry; six credits of organic chemistry (Chemistry 357–358 or 359–360); a minimum of four credits of organic chemistry laboratory (Chemistry 301–302 or 251–252–302 or 301 or 251–252); four credits of biochemistry laboratory courses (BIOBM 430); and Physical Chemistry (Chemistry 389–390 or 287–288 or 287–390 or 389–288).

Note: Chemistry 288 is designed for biologists. Five hours of Biochemistry are recommended (331 and 332 or 330 and 334 or 333 and 334) and students interested in graduate work in biochemistry should take Physics 207–208 and consider taking a third semester of calculus in preparation for CHEM 389–390. Be sure to complete CHEM 207–208 or 215–216 during the freshman year.

Note: Biology majors in the College of Agriculture and Life Sciences who select this program of study are allowed to take up to 61 credit hours in the endowed colleges due to the high number of required endowed courses for Biochemistry.

3) *Computational Biology:* One course in computer programming (COM S 100, Introduction to Computer Programming or ABEN 151, Introduction to Computing); one course in mathematics (MATH 221, Linear Algebra and Calculus; MATH 231, Linear Algebra; MATH 294, Engineering Mathematics; MATH 420, Differential Equations and Dynamical Systems; BTRY 408, Theory of Probability; or BTRY 421, Matrix Computation); a bridging course, i.e., a course in mathematical modeling applied to biology (BIOEE 460, Theoretical Ecology; or BIOBM 321, Numerical Methods in Computational Molecular Biology); and one course from the following list of advanced courses:

   BIOBM 631, Protein Structure and Function; BIOGD 481, Population Genetics; BIOGD 484, Molecular Evolution; BIONB 422, Modeling Behavioral Evolution; BIOPL 440, Phylogenetic Systematics; AN SC 420, Quantitative Animal Genetics; NTRES 305, Wildlife Ecology; NTRES 340, Quantitative Population Analysis; NTRES 410, Quantitative Methods in Wildlife Management; NTRES 670,

Spatial Statistics; BTRY 451, Mathematical Modeling of Populations; BTRY 662, Mathematical Ecology; BTRY 408, Theory of Probability; MATH 420, Differential Equations and Dynamical Systems; COM S 211, Computers and Programming; COM S 409, Data Structures and Algorithms for Computational Science; OR&IE 360, Engineering Probability and Statistics II; OR&IE 361, Introductory Engineering Stochastic Processes.

Note: MATH 112, Calculus should be used to fulfill the core requirement for a second term of math.

Note: Bridging courses require linear algebra (MATH 221, Linear Algebra and Calculus; or MATH 231, Linear Algebra; or MATH 294, Engineering Mathematics; or BTRY 421, Matrix Computation). For bridging course BIOEE 460 Theoretical Ecology, MATH 420 Differential Equations and Dynamical Systems will also serve as a prerequisite.

Note: BTRY 408 and MATH 420 can satisfy either the math requirement or a requirement for an additional course.

Note: Students who use BTRY 408 to fulfill the additional mathematics requirement should not use OR&IE 360, Engineering Probability and Statistics II to fulfill the requirement for an additional course.

4) *Ecology and Evolutionary Biology:* BIOEE 261, Ecology and the Environment, and 10 credits from the following course lists, including at least one course from each group:

   (a) BIOPL 241, Introductory Botany; BIOEE 274, The Vertebrates: Structure, Function, and Evolution; BIOEE 373, Biology of the Marine Invertebrates; BIOMI 415, Bacterial Diversity; BIOEE 471, Mammalogy; BIOEE 472, Herpetology; BIOEE 475, Ornithology; BIOEE 476, Biology of Fishes; ENTOM 212, Insect Biology.

   (b) BIOEE 263, Field Ecology; BIOPL 447, Molecular Systematics; BIOPL 448, Plant Evolution and the Fossil Record; BIOEE 452, Herbivores and Plants: Chemical Ecology and Coevolution; BIOEE 455, Insect Ecology; BIOEE 456, Stream Ecology; BIOEE 457 and 459, Limnology: Ecology of Lakes, Lectures and Laboratory; BIOEE 460, Theoretical Ecology; BIOEE 462, Marine Ecology; BIOEE 463 and 465, Plant Ecology and Population Biology, Lectures and Laboratory; BIOEE 464, Macroevolution; BIOEE 466 and 468, Physiological Plant Ecology, Lectures and Laboratory; BIOEE 473, Ecology of Agricultural Systems; BIOEE 478, Ecosystem Biology; BIOEE 479, Paleobiology; BIOGD 481, Population Genetics; BIOGD 484, Molecular Evolution.

Note: One 400-level, four-credit course (including four credits from BIOSM 364) offered at Shoals Marine Laboratory may be applied toward the 10 credits. Students are encouraged to gain experience in some aspect of field biology through course work at a biological field station or work experience.

Note: The Ecology and Evolutionary Biology program of study offers an undergraduate specialization in Marine Biology and Oceanography. A description of this specialization can be found in the section entitled COURSES IN MARINE SCIENCE.

Note: The Organization for Tropical Studies (OTS) offers an Undergraduate Semester Abroad Program, featuring two courses in biology (Fundamentals of Tropical Biology and Field Research in Tropical Biology) and one course each in Environmental Policy and Latin American Culture. Cornell biology majors in the Ecology and Evolutionary Biology Program of Study who complete the OTS Program as part of Cornell Abroad can substitute the credit earned from the biology courses for two three-credit courses at the 400 level from list b. The OTS Program is administered through Duke University. Applications are available at Cornell Abroad, 474 Uris Hall.

5) *General Biology:* The Program of Study in General Biology requires a minimum of 13 credit hours in addition to courses counted toward requirements 1–10 on page 144. These 13 credits must include:

   a) One course from each of three different programs of study in biology. Only those courses specifically listed as fulfilling a program of study requirement are acceptable without permission of adviser.

   b) A course with a laboratory.

   c) And, a minimum of two upper-level (300 and above) courses of two or more credits each.

100-level courses are not acceptable for meeting any of these requirements. BIOPL 341 may not count as the lab course; BIO G 498 may not be used to fulfill the requirements of this program of study. BIO G 499 (minimum of two credits, but no more than three credits) may count as one of the upper-level courses, and may count as the laboratory course with approval of the adviser, but it cannot count as a course representing a program of study.

Note: It is possible to use a single course to fulfill more than one requirement. For example, BIOAP 313, Histology, could count in all three areas: as a course in the Animal Physiology program of study, as an upper level course, and as a course with a lab.

6) *Genetics and Development:* A minimum of 13 credits, usually chosen from the following courses: BIOGD 385, Developmental Biology; BIOGD 387, Developmental Aspects of Evolution; BIOGD 389, Embryology; BIOGD 450, Vertebrate Development; BIOGD 480, Seminar in Developmental Biology; BIOGD 481, Population Genetics; BIOGD 482, Human Genetics and Society; BIOGD 483, Advanced Develpmental Biology; BIOGD 484, Molecular Evolution; BIOGD 486, Advanced Eukaryotic Genetics; BIOMI 485, Bacterial Genetics; BIONB 493, Developmental Neurobiology; BIOPL 343, Molecular Biology and Genetic Engineering of Plants; BIOGD 600, Development of Sensory Systems.

Students may also choose from the following courses to complete the 13-credit requirement: BIOGD 682, Fertilization and Early Development; BIOGD 684, Advanced Topics in Population Genetics; BIOGD 687, Developmental Genetics; BIOBM 633, Biosynthesis of Macromolecules; BIOBM 639, The Nucleus; BIOEE 663, Theoretical Population Genetics; BIOMI 694, Genetics of Diverse Bacteria; BIOPL 641, Laboratory in Plant Molecular Biology; BIOPL 644, Plant Growth and Development; BIOPL 652, Plant Molecular Biology II; BIOPL 653, Plant Molecular Biology I; PL BR 606, Advanced Plant Genetics.

Up to three credits for this program of study may be chosen from other biological sciences courses, including BIO G 499, Undergraduate Research in Biology, with approval of the faculty adviser.

7) *Microbiology:* At least 13 credits including: BIOMI 290, General Microbiology, Lectures; BIOMI 291, General Microbiology, Laboratory; either BIOMI 414, Bacterial Diversity or BIOMI 416, Bacterial Physiology, and at least 2 courses from the following list: BIOMI 391, Advanced Microbiology Laboratory; BIOMI 418, Microbial Ecology; BIOMI 420, Microbial Genomics; or BIOMI 485, Bacterial Genetics.

8) *Molecular and Cell Biology:* Chemistry 357–358 or 359–360; BIOBM 432, Survey of Cell Biology; four credits of BIOBM 430, Laboratories in Biochemistry, Molecular and Cell Biology, and at least seven additional credits of courses that have a cell biological or molecular biological orientation. The seven additional hours should include at least two courses from the following list: BIOAP 619, Lipids; BIOAP 658, Molecular Mechanisms of Hormone Action; BIOBM 407, Nature of Sensing and Response: Signal Transduction in Biological Systems; BIOBM 434, Applications of Molecular Biology; BIOBM 437, Eukaryotic Cell Proliferation; BIOBM 439, Molecular Basis of Human Disease; BIOBM 631, Protein Structure and Function; BIOBM 632, Membranes and Bioenergetics; BIOBM 633, Biosynthesis of Macromolecules; BIOBM 635, Mechanisms of Metabolic Regulation and Mammalian Gene Expression; BIOBM 636, Advanced Cell Biology; BIOBM 639, The Nucleus; BIO G 305, Immunology; BIOGD 385, Developmental Biology; BIOGD 483, Molecular Aspects of Development; BIOGD 484, Molecular Evolution; BIOGD 486, Advanced Eukaryotic Genetics; BIOGD 682, Fertilization and the Early Embryo; BIOMI 290, General Microbiology, Lectures; BIOMI 408, Viruses and Disease I; BIOMI 409, Viruses and Disease II; BIOMI 485, Bacterial Genetics; BIONB 222, Neurobiology and Behavior II: Introduction to Neurobiology; BIONB 325, Neurodiseases-Molecular Aspects; BIONB 425, Molecular Neurophysiology; BIONB 495, Molecular and Genetic Approaches to Neurosciences; BIOPL 343, Molecular Biology and

Genetic Engineering of Plants; BIOPL 347, Laboratory in Molecular Biology and Genetic Engineering of Plants; BIOPL 444, Plant Cell Biology; BIOPL 641, Laboratory in Plant Molecular Biology; BIOPL 652, Plant Molecular Biology II. Five hours of biochemistry are recommended (BIOBM 331 and 332, or 330 and 334). CHEM 207-208 or 215-216 should be completed during the freshman year.

9) *Neurobiology and Behavior:* The two-semester introductory course sequence, Neurobiology and Behavior I and II (BIONB 221 and 222) with discussion section (four-credits per term), and seven additional credits. These additional credits must include a course from the neurobiology and behavior offerings (this course can NOT be BIONB 420, 720, or BIOG 499). However, BIONB 420, 720 and BIO G 499 MAY be used to supplement this neurobiology and behavior course to fulfill the seven additional credits. Students must consult their adviser for courses that may be applied toward the seven additional credits that are not listed in the Biological Sciences course offerings. BIO G 498 may not be used to fulfill the requirements of this program of study.

Note: Students who declare the Program of Study in Neurobiology and Behavior after taking BIONB 221 or 222 for only three credits must still take the 1 credit discussion section in BIONB 221 and 222. To arrange this, the student should consult the professors in charge of the two courses. In the event that a student cannot take the discussion sections, he or she should contact the department Director of Undergraduate Studies to determine what course(s) to use to address the deficiency.

10) *Nutrition:* NS 331, Physiological and Biochemical Bases of Human Nutrition (4 credits) and at least nine credits of additional coursework in the biological aspects of nutrition, such as NS 315, Obesity and the Regulation of Body Weight; NS 332, Methods in Nutritional Sciences; NS 431, Mineral Nutrition and Chronic Disease; NS 441, Nutrition and Disease; NS 475, Molecular Nutrition and Development; NS 602, Lipids; NS 604, The Vitamins; and NS 614, Topics in Maternal and Child Nutrition. Some courses require NS 115 Nutrition and Health: Concepts and Controversies, which may be used as part of the additional nine credits.

Note: For students in the College of Agriculture and Life Sciences, credits in NS courses count towards the required 55 CALS credits. For students in the College of Arts and Sciences, NS credits will count toward the 100 hours required in A&S if those credits fulfill major requirements.

11) *Plant Biology:* Students choose one area of study from the following two options:

Option (a) *Botany:* Students are required to take Introductory Botany (BIOPL 241). Students should then choose, with the aid of their faculty adviser, a minimum of three of the following courses, for a total of at least 10 additional credits, to round out their botanical training: BIOPL 242 and 244, Plant Function and Growth, Lectures and Laboratory; BIOPL 247, Ethnobiology; BIOPL 248, Taxonomy of Vascular Plants; BIOPL 342 and 344, Plant Physiology, Lectures and Laboratory; BIOPL 343 and 347, Molecular Biology and Genetic Engineering of Plants, Lectures and Laboratory; BIOPL 345, Plant Anatomy; BIOPL 444, Plant Cell Biology; BIOPL 445, Photosynthesis; BIOPL 447, Molecular Systematics; BIOPL 448, Plant Evolution and the Fossil Record; BIOEE 463 and 465, Plant Ecology and Population Biology, Lectures and Laboratory; or BIOEE 466 and 468, Physiological Plant Ecology, Lectures and Laboratory.

Option (b) *Plant Biotechnology:* Students are required to take BIOPL 343 and 347, Molecular Biology and Genetic Engineering of Plants, Lectures and Laboratory. Students choose, in consultation with their faculty adviser, a minimum of 10 additional credits from the following list: BIOPL 241, Introductory Botany; BIOPL 242 and 244, Plant Function and Growth, Lectures and Laboratory; BIOPL 342 and 344, Plant Physiology, Lectures and Laboratory; BIOPL 444, Plant Cell Biology; BIOPL 648, Plant Biochemistry; PL BR 401, Plant Cell and Tissue Culture; or PL BR 402, Plant Tissue Culture Laboratory.

12) *Systematics and Biotic Diversity:* A minimum of 13 credits from the following two groups, including at least seven credits from group (a), and three from group (b), and at least two laboratory courses (marked with *). BIO G 499, Undergraduate Research in Biology, with approval of the adviser, can be used in fulfillment of up to four credits in group (a), and can count as one laboratory course if it has a laboratory component of two or more credits.

(a) *BIOEE 274, The Vertebrates: Structure, Function, and Evolution; *BIOEE 371, Human Paleontology; *BIOEE 373, The Invertebrates: Form, Function, and Evolution; *BIOEE 471, Mammalogy; *BIOEE 472, Herpetology; *BIOEE 475, Ornithology; *BIOEE 476, Biology of Fishes; BIOMI 290, General Microbiology, Lectures; *BIOMI 291, General Microbiology, Laboratory; BIOMI 415, Bacterial Diversity, Lectures; *BIOPL 241, Introductory Botany; *BIOPL 243, Taxonomy of Cultivated Plants; BIOPL 247, Ethnobiology; *BIOPL 248, Taxonomy of Vascular Plants; BIOPL 343, The Healing Forest; BIOPL 645, Families of Tropical Flowering Plants, Lectures; *BIOPL 646, Families of Tropical Flowering Plants; *ENTOM 212, Insect Biology; ENTOM 215, Spider Biology: Life on a Silken Thread; *ENTOM 322, Insect Morphology; *ENTOM 331, Introductory Insect Systematics; *ENTOM 471, Freshwater Invertebrate Biology; *ENTOM 631, Systematics of the Coleoptera; PL PA 309, Introductory Mycology; *PL PA 319, Field Mycology.

(b) BIOEE 464, Macroevolution; BIOEE 479, Paleobiology; *BIOPL 440, Phylogenetic Systematics; BIOPL 447, Molecular Systematics; *BIOPL 448, Plant Evolution and the Fossil Record; *BIOPL 453, Historical Biogeography; BIOPL 442, Current Topics in Ethnobiology.

13) *Independent Option:* Students who want to undertake a course of study not covered by the existing programs of study may petition the Biological Sciences Curriculum Committee. Information on independent option and Curriculum Committee petition forms are available in the Office of Undergraduate Biology, 216 Stimson Hall.

Independent Research and Honors Program

Biology majors are encouraged to consider participating in individual research under the direction of a Cornell faculty member. Students interested in participating in research should contact faculty members with compatible research interests. Faculty members may consider the students' previous academic accomplishments, interests and goals, and the availability of space and equipment when agreeing to supervise a student in his or her laboratory. Students conducting research may enroll for credit in Biological Sciences BIO G 499, Undergraduate Research in Biology. Registration for this course is done in 216 Stimson Hall. The student's research project must have significant biological content in order to be considered for BIO G 499 credit. Students may not earn credit for research conducted outside of Cornell. Up to three credits of research may be used to complete the program of studies in general biology, genetics and development, systematics and biotic diversity, as well as four credits of research in neurobiology and behavior. Information about faculty research interests and undergraduate research opportunities is available in the Office of Undergraduate Biology, 216 Stimson Hall.

The Honors program in biological sciences is designed to offer advanced training in laboratory or field research through the performance of an original research project under the direct guidance of a member of the Cornell faculty. Applications for the honors program are available in the Office of Undergraduate Biology, 216 Stimson Hall, and must be submitted in October of the senior year to the Honors Program Committee by the announced deadline. To qualify for the program, students must have been accepted into the biological sciences major, have completed at least 30 credits at Cornell, and have a cumulative grade-point average of at least 3.0. In addition, students must have at least a 3.0 cumulative grade-point average in all biology, chemistry, mathematics, and physics courses. (Grades earned in courses in other departments that are used to fulfill biology major requirements are included in this computation.) In addition, candidates must find a Cornell faculty member in Biological Sciences to supervise their research. An honors candidate usually enrolls for credit in BIO G 499, Undergraduate Research in Biology, under the direction of the faculty member acting as honors supervisor, although the Honors Program does not require enrollment for credit. Students accepted into

the Honors program are required to participate in honors research seminars during both semesters of their senior year; submit an acceptable honors thesis; complete all major requirements; and maintain a 3.00 Cornell cumulative and science grade-point average through graduation. Recommendation to the faculty that a candidate graduate with honors and at what level of honors is the responsibility of the Honors Program Committee. The student's final grade point average is a factor in determining the level of honors recommended.

Students interested in the honors program are strongly encouraged to begin their research projects in their junior year and to consider spending the following summer here at Cornell engaged in full time research on their honors project. Students interested in staying for the summer also are encouraged to apply to the Cornell Hughes Scholars Program.

Biology majors who are considering study abroad and graduating with honors are encouraged to meet with their academic adviser during their sophomore year to carefully plan their academic schedule to meet the requirements of the Honors program.

Application forms, requirements, deadline dates for the Honors Program and the Hughes Scholars Program, and information pertaining to faculty research may be obtained at the Office of Undergraduate Biology, 216 Stimson Hall.

CURRICULUM COMMITTEE

Many decisions pertaining to the curriculum and to the programs of study are made by the Biology Curriculum Committee. The committee consists of faculty and elected student members and welcomes advice and suggestions from all interested parties.

ADVISING

Students in need of academic advice are encouraged to consult their advisers or come to the Office of Undergraduate Biology, 216 Stimson Hall.

Students interested in marine biology should visit the Shoals Marine Laboratory Office, G14 Stimson Hall.

Students interested in the multidisciplinary program of Biology and Society should see "Special Programs and Interdisciplinary Studies," in the College of Arts and Sciences section of this catalog.

INDEX OF COURSES

The following course identifiers are used to denote biological sciences courses in specific areas: General Courses, BIO G; Animal Physiology, BIOAP; Biochemistry, Molecular and Cell Biology, BIOBM; Ecology and Evolutionary Biology, BIOEE; Genetics and Development, BIOGD; Microbiology, BIOMI; Neurobiology and Behavior, BIONB; Plant Biology, BIOPL; Shoals Marine Laboratory, BIOSM.

Note: Biological sciences ("BIO") courses count as agriculture and life sciences credits for students in the College of Agriculture and Life Sciences and as arts and sciences credits for students in the College of Arts and Sciences.

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GENERAL COURSES (BIO G)

Three introductory biology course sequences are taught during the academic year: BIO G 101–104, BIO G 105–106, and BIO G 109–110; and one during the eight-week summer session: BIO G 107–108. BIO G 101–104, 105–106, and 107–108 are intended for biological sciences majors and other students needing eight credits from an introductory sequence for majors (for example, students in a premedical curriculum). Any of these sequences meet the prerequisite for upper-level courses listing "one year of introductory biology for majors" as a prerequisite. BIO G 109–110 is a course sequence intended for nonmajors, and meets the prerequisite for many, but not all, upper-level courses listing "one year of introductory biology" as a prerequisite. Students can earn a maximum of eight credits in introductory biology (including advanced placement credits).

BIO G 101–102 Biological Sciences, Lectures

101, fall; 102, spring. 2 credits each term. Prerequisite: concurrent enrollment in BIO G 103 (fall) or 104 (spring). Passing grade (D or better) in 101 is prerequisite to 102 unless permission is obtained from instructor. May not be taken for credit after BIO G 105–106 or 109–110. S-U grades optional, with permission of instructor. Lecs, M W F 9:05 or 10:10. 2 lecs each week; to accommodate these, students must reserve all 3 days. Evening prelims: fall, Sept. 25 and Nov. 6; spring, Feb. 21 and Apr. 4. Staff.

Designed both for students who intend to specialize in biological sciences and for those who want to obtain a thorough knowledge of biology as part of their general education. The fall semester covers the chemical and cellular basis of life, energy transformations, physiology, neurobiology, and behavior. The spring semester covers genetics, development, evolution, and ecology. Each topic is considered in terms of modern evolutionary theory, and discussions of plant and animal systems are integrated. For those students who object to animal dissection, alternative materials are available for study. However, testing will involve identification of important structures in real organisms.

BIO G 103–104 Biological Sciences, Laboratory

103, fall; 104, spring. 2 credits each term. Prerequisite: concurrent enrollment in BIO G 101 (fall) or 102 (spring). 103 is prerequisite to 104 unless permission is obtained from instructor. No admittance after second week of classes. S-U grades optional, with permission of instructor. Lab, M T W or R 1:25–4:25, M or W 7:30–10:30 P.M., or T R or S 8–11. One 3-hour lab each week and a weekly lec for discs, special lecs, etc. J. C. Glase, P. R. Ecklund, and staff.

BIO G 103–104 is designed to provide laboratory experience with major biological phenomena in order to support an understanding of the important concepts, principles, and theories of modern biology. A second objective of the laboratory course is to help students gain expertise in the methods used by biologists to construct new knowledge. Students are exposed to basic concepts, research methods, including laboratory and data transformation techniques, and instrumentation in the major areas of biology. First-semester topics include biochemistry, physiology, plant biology, and behavior. In the second semester, laboratory experience is provided in the areas of genetics, biotechnology, invertebrate diversity, plant and animal development, and ecology. During the first semester, dissection of a doubly-pithed frog is included. Pithing is done by the instructor. Dissection of several invertebrates occurs during the second semester. For those students who object to animal dissection, alternative materials are available for study. However, testing will involve identification of important structures in real organisms.

BIO G 105–106 Introductory Biology

105, fall; 106, spring. 4 credits each term (or 2 credits, with permission of instructor). Enrollment limited to 200 students. Prerequisite: 105 is prerequisite to 106, unless written permission is obtained from instructor. May not be taken for credit after BIO G 101–104 or 109–110. No admittance after first week of classes. Lec, T 9:05 (first lec of fall term, R 8/30 9:05); additional study and lab hours TBA. C. H. McFadden and staff.

Designed primarily for biology majors, preprofessionals, and other students who desire a challenging, broad introduction to fundamental concepts of biology. Cell biology, physiology, anatomy (accompanied by preserved vertebrate dissection), and biochemistry are strongly emphasized in the fall semester. Subjects in the spring semester are genetics, development, ecology, evolution, behavior, and the diversity of organisms (accompanied by preserved and anesthetized invertebrate dissection). Students who plan to concentrate in anatomy and physiology should consider taking this course because of the strong emphasis on organismal biology. Because some testing involves the use of predissected specimens, students who object to dissections should take BIO G 101–104. The course uses an autotutorial format and offers considerable flexibility in scheduling. Completion of the course requires mastery of a group of core units. Testing on these units is primarily by oral examination. Students who elect to take the course must be able to meet deadlines. Four formal laboratory sessions are offered each semester; additional laboratory work is included in the core units. Evaluation is based on written reports on experimental work, practical exams, and a comprehensive final exam.

BIO G 107–108 General Biology

Summer (8-week session; 107, weeks 1–4; 108, weeks 5–8). 4 credits each. Prerequisite: one year of college or permission of instructor; BIO G 101, 103, 105, or 107 is a prerequisite for 108. Fee, $25 for weeks 1–4; $15 for weeks 5–8. Lecs, M-R 9–12; labs, M T R 1:30–4:30, F 9–12. Staff.

Designed for students who plan further study in biology and for students who want a broad course in biology as part of their general education. BIO G 107 covers biological metabolism, first at the molecular level and then progressively to the organ system level. The laboratory work involves an introduction to some major techniques, vertebrate dissection, and a survey of plant organization. BIO G 108 seeks to integrate the topics of genetics, developmental biology, population biology, and ecology in a general consideration of biological evolution. The laboratory work is a continuation of the material covered in BIO G 107 and involves more techniques, a survey of animal organization, and the design and performance of a field study. BIO G 107–108 fulfills the introductory biology requirement for majors and forms a suitable introductory biology course sequence for students intending to go to medical school. For those students who object to animal dissection, alternative materials are available for study. However, testing will involve identification of important structures in real organisms.

BIO G 109–110 Biological Principles
109, fall; 110, spring. 3 credits each term. Limited to 600 students. A passing grade in BIO 109, AY2000 or later, is prerequisite to BIO 110 unless *written* permission is obtained from the *instructor*. Since BIO G 109–110 together constitute an integrated survey, 109 cannot be used to satisfy the College of Arts and Sciences or College of Agriculture and Life Sciences distribution requirement unless it is followed by 110 or equivalent. Due to overlap in content, BIO G 109 may not be taken after BIO G 102/104 or BIO G 106. BIO G 110 may not be taken after BIO 101–102 or BIO G 105. This course sequence may be used to fulfill the distribution requirement in the Colleges of Agriculture and Life Sciences, Arts and Sciences, and Human Ecology but may *not* be used as an introductory course for the major in biological sciences or as introductory biology for premedical requirements. *Note that this course satisfies the prerequisite for many, but not all second- and third-level courses in biology.* Letter grade only. Students do not choose lab sections during course enrollment; lab assignments are made during the first day of classes. Evening prelims: fall, Sept. 25 and Nov. 6; spring, Feb. 21 and Apr. 4. Lecs, M W F 9:05 or 10:10; lab meets alternate M T W R or F 2–4:25 or T 10:10–12:35. H. Greene, R. Turgeon, C. Eberhard and staff.

Students who do not plan to major in biology may take this broad introductory course. The content is designed to appeal to anyone who seeks a comprehensive knowledge of biology as part of a general education. Broad goals of the course encompass an understanding of the potential benefits and limitations of science, the complexity and workings of the natural world, and the internal machinery of life—how our bodies and those of other animals and plants work. Fall semester covers biological diversity, genetics, evolution, ecology, behavior and conservation biology; spring semester covers human physiology, plant development, genetic engineering, infectious diseases, and human health. Laboratory sections enable small groups of students to meet with course staff and are used for problem-solving experiments, demonstrations, and discussions. There are dissections of preserved vertebrate, invertebrate, and plant materials; for those students who object to dissection, alternative materials are available for study and there is no grade penalty for omitting dissection or observation of animals. Testing, for students choosing to be tested, will involve identification of important structures in real organisms.

BIO G 170 Evolution of the Earth and Life (also EAS 102)
Spring. 3 credits. S-U grades optional. Lecs, T R 9:05 or 11:15; lab, T W or R 2:00–4:25; field trips during lab. J. L. Cisne.

Earth systems and their evolution. Earth history's astronomical context. Plate tectonics, continental drift, and their implications for climate and life. Coevolution of life and the atmosphere. Precedents for ongoing global change. The course covers dinosaurs, mass extinctions, and human ancestry. Laboratories include work on reconstructing geological history and mapping ancient geography. Fossil-collecting on field trips.

BIO G 200 Special Studies in Biology
Fall, spring, or summer. 1–3 credits. Prerequisites: written permission from the Office of Undergraduate Biology. Students must register in 216 Stimson Hall. S-U grades optional, with permission of instructor. Hours TBA. Staff.

A registration device for students who want to take only a portion of a regular biological sciences course—for example, only the lectures or only the laboratory in a course that includes both. Only students who have already had training equivalent to the portion of the regular course that is to be omitted may register in this manner. This course may not be substituted for 100–level courses and may not be used in fulfillment of college distribution requirements except by permission from the Office of Undergraduate Biology

[BIO G 202 The Diversity of Life
Fall. 3 credits. S-U grades optional. Lecs, M W F 2:30. Not offered 2001–2002. J. I. Davis, J. J. Doyle, E. Rodriguez.

The main focus of this course is on the diversity of living and extinct species. This diversity is examined from an evolutionary perspective, with attention to the principles employed in the discovery of species and in the analysis of relationships among them. Interactions between humans and other species are examined during the latter portion of the semester.]

BIO G 209 Introduction to Natural Science Illustration
Summer (6-week session). 2 credits. Limited to 12 students. Prerequisite: freehand drawing or permission of instructor. S-U grades optional. Lecs and labs, T R 6:30–9:30 P.M. B. S. King.

An introduction to the art of natural science illustration for publication, and to the techniques of various media including pencil, pen and ink, watercolor, colored pencil, scratchboard, and carbon dust. Potentials and limitations of line and half-tone reproduction, copyright, and portfolio presentation are discussed.

BIO G 305 Basic Immunology Lectures (also VETMI 315)
Fall. 3 credits. Strongly recommended: basic courses in microbiology, biochemistry, and genetics. S-U grades optional, with permission of instructor. Lecs, T R 8:30–9:55. J. A. Marsh.

A survey of immunology, with emphasis on the biological functions of the immune response.

BIO G 400 Undergraduate Seminar in Biology
Fall or spring. Variable credit (1–3 credits assigned for individual seminar offerings). May be repeated for credit. S-U grades optional. Sem TBA. Staff.

From time to time specialized seminars on topics of interest to undergraduates are offered by visiting faculty or faculty from the departments of Ecology and Systematics, Genetics and Development, or Plant Biology. For students interested in Biochemistry, Physiology, or Neurobiology, please see descriptions under the appropriate section.

BIO G 401 Introduction to Scanning Electron Microscopy
Fall or spring, weeks 1–8. 1 credit. Limited to 8 students (fall), 12 students (spring). S-U grades optional. Fee may be charged. Lec, M 10:10; lab, T R or F 9:05–12:15 or T W or R 1:25–4:25. M. V. Parthasarathy.

An introductory course that includes the principle and use of the scanning electron microscope. Students use biological material to explore and understand some of the fine biological architecture. In addition to preparing the specimens, students use the scanning electron microscope to study and obtain micrographs of features that interest them.

BIO G 403 Transmission Electron Microscopy for Biologists
Fall. 1, 3, or 4 credits (4 credits if student takes both sections). Limited to 12 students. Prerequisites: BIOAP 313, BIOPL 345 or 443. S-U grades optional. Two sections: Sec 01, 1 credit, weeks 1–4; sec 02, 3 credits, weeks 5–12. Students may register for one or both sections. Fee may be charged. Lec, T 11:15; labs, M W or T R 1:25–4:25. M. V. Parthasarathy.

Section 01, 1 credit, weeks 1–4, covers the principles and use of the transmission electron microscopy (TEM), with emphasis on proper operation of the instrument and interpretation of images obtained. Negatively stained materials are used for viewing with the transmission electron microscope. Section 02, 3 credits, weeks 5–12, covers the principles and techniques of preparing biological material for transmission electron microscopy. Using animal, plant, and microbe materials this section studies chemical fixtures, cryofixations, ultrathin sectioning, immunogold localization, quantitative microscopy, and metal shadowing techniques. Students have two additional weeks to complete laboratory assignments at the end of each section.

BIO G 408 Presentation Skills for Biologists
Spring. 1 credit. Prerequisites: previous research experience. Preference given to students accepted into the Honors Program. L. Southard and G. Hess.

This course will cover oral and written communication skills used in presenting research to other scientists. Topics covered will include organization of scientific papers, presentation tips for research seminars, and preparation of visual aids using Power Point. All students will present a 10-minute seminar on their research and will evaluate other presentations.

BIO G 410 Teaching Contemporary Biology
Fall. 3 credits. Prerequisite: one year introductory biology; permission of instructor. L. Southard and S. Merkel.

This course provides students with the opportunity to experience teaching high school science. Students will concentrate on a topic of current public interest, then develop teaching plans appropriate for high school students. The first part of the course consists of lectures, discussion, and laboratory experiments, which will familiarize the students with the scientific content of the course. Students will then work in teams with high school teachers to develop their presentations. The final part of the course will include practice presentations and teaching at regional high schools.

BIO G 431 Frontiers in Biophysics
Fall. 1/2 credit. S-U grades only. Lec TBA. G. Feigenson and staff.

A day of lectures on Saturday TBA giving an overview of current research in biophysics at Cornell by faculty from different departments

across the university. Designed for undergraduates who are considering a career in biophysics and for graduate students who are interested in biophysics research opportunities at Cornell.

[BIO G 450 Light and Video Microscopy for Biologists
Spring. 3 credits. Limited to 12 students. Prerequisites: one year of introductory biology and permission of instructor. Lecs, T R 1:25–2:30; lab, R 2:30–4:30. Not offered 2001–2002. R. O. Wayne.
Theoretical and practical aspects of light microscopy, including brightfield, darkfield, phase-contrast, polarization, Hoffman-modulation contrast, interference, differential-interference contrast, and fluorescence microscopy, as well as video- and computer-based digital image enhancement, are studied. Students learn both qualitative and quantitative techniques to probe noninvasively the structure and function of living cells.]

BIO G 498 Teaching Experience
Fall or spring. 1–4 credits. Enrollment limited. Prerequisites: previous enrollment in the course to be taught or equivalent. *Arts students may not count this course toward graduation. They may, however, upon petition to their class dean, carry fewer than 12 other credits and remain in good standing. This would affect Dean's List eligibility, but not eligibility for graduating with distinction.* S-U grades optional, with permission of instructor. Hours TBA. Staff.
Designed to give qualified undergraduate students teaching experience through actual involvement in planning and assisting in biology courses. This experience may include supervised participation in a discussion group, assisting in a biology laboratory, assisting in field biology, or tutoring. Biological sciences courses currently offering such experience include BIO G 105–106; BIOAP 311, 313, 319; BIOBM 330, 331; BIOEE 274, 475; BIOGD 281; and BIOMI 291, 292.

BIO G 499 Undergraduate Research in Biology
Fall or spring. Variable credit. *Students in the College of Arts and Sciences may not register for more than 6 credits per term with one supervisor or 8 credits per term with more than one supervisor.* Prerequisite: written permission of staff member who supervises the work and assigns the grade. Students must register in the Office of Undergraduate Biology in 216 Stimson Hall. Each student must submit an independent study statement describing the proposed research project during course registration. Applications are available in the college offices and in 216 Stimson Hall. Any faculty member in Biological Sciences may act as a supervisor. Supervisors outside of Cornell are not acceptable. S-U grades optional. Hours TBA. Staff.
Practice in planning, conducting, and reporting independent laboratory and library research programs. Up to three credits of research may be used to complete the Programs of Study in general biology, genetics and development, and systematics and biotic diversity, and four credits of research in neurobiology and behavior.

BIO G 663 Nanobiotechnology (also AEP 663)
Spring. 3 credits. Prerequisite: permission of instructor. Letter grade. Lec, T R 1:25–2:40. Nanobiotechnology faculty.
Nanobiotechnology is the application of nano- and microfabrication methods to build tools for exploring the mysteries of biological systems. It is a graduate-level course that will cover the basics of biology and the principles and practice of microfabrication techniques with a focus on applications in biomedical and biological research. One objective of the course is to facilitate a means through which biologists and engineers can communicate. A team design project that stresses interdisciplinary communication and problem solving will be one of the course requirements.

BIO G 705 Advanced Immunology Lectures (also VETMI 705)
Spring. 4 credits. Prerequisite: BIO G 305 or permission of instructor. Offered alternate years. Next offered spring 2002. Lecs, M W F 9:05. Coordinator: E. J. Pearce.
Coverage at an advanced level of molecular and cellular immunology.

BIO G 706 Immunology of Infectious Diseases (also VETMI 719)
Spring. 2 credits. Prerequisite: BIO G 305 or permission of instructor. S-U grades optional, with permission of instructor. Lec, R 10:10–12:05. Offered alternate years. Coordinator: E. Denkers.
Coverage at an advanced level of the immunology of diseases caused by selected bacterial, viral, protozoan, and helminthic parasites.

Related Courses in Other Departments

The Sea: An Introduction to Oceanography (Biological Sciences [BIOEE] 154) Medicine and Civilization (Biology and Society 322)

Pathogenic Bacteriology and Mycology (Biological Sciences [BIOMI] 404 and Veterinary Microbiology 318)

Viruses and Disease (Biological Sciences [BIOMI] 408 and Veterinary Microbiology 408)

ANIMAL PHYSIOLOGY (BIOAP)

BIOAP 212 Human Physiology for Non-Biology Majors
Spring. 3 credits. May not be taken for credit after BIOAP 311. Limited to 130 students. This course may be used toward the science distribution requirement of the College of Arts and Sciences and the Group B distribution requirement of the College of Agriculture and Life Sciences. This course may not be used to fulfill the requirements of any program of study in the biological sciences major. Lecs, M W F 1:25; disc, M W or F 2:15. M. D. Baustian.
Introduction to the principles of physiology governing the function of the human body. Emphasis will be placed on reproduction, pregnancy and development, and immunology and the defense of the organism against disease. Major organ systems will be surveyed to illustrate how physiologists study the function of living systems, and how this knowledge has shaped the management of health and disease. The contribution of information based sciences of genetics, molecular biology, and the emerging biotechnologies to the study of human physiology will be covered.

[BIOAP 214 Biological Basis of Sex Differences (also B&SOC 214 and WOMNS 214)
Spring. 3 credits. Prerequisite: one year of introductory biology. S-U grades optional. Lecs, T R 1:25–2:40. Offered alternate years. Not offered 2001–2002. J. E. Fortune.
The structural and functional differences between the sexes are examined. Emphasis is placed on mechanisms of mammalian reproduction; where possible, special attention is given to studies of humans. Current evidence on the effects of gender on nonreproductive aspects of life (behavior, mental, and physical capabilities) is discussed. The course is intended to provide students with a basic knowledge of reproductive endocrinology and with a basis for objective evaluation of sex differences in relation to contemporary life.]

BIOAP 311 Introductory Animal Physiology, Lectures (also VETPH 346)
Fall. 3 credits. Prerequisites: one year of college biology, chemistry, and mathematics. Recommended: previous or concurrent course in physics. S-U grades optional, with permission of instructor. Evening prelims. Lecs, M W F 11:15. E. R. Loew.
A general course in animal physiology emphasizing principles of operation, regulation, and integration common to a broad range of living systems from the cellular to the organismal level. Structure/function relationships are stressed along with underlying physico-chemical mechanisms.

BIOAP 312 Farm Animal Behavior (also ANSC 305)
Spring. 2 credits. Prerequisites: introductory animal physiology (AN SC 100 and 150 or equivalent). Recommended: at least one animal production course or equivalent experience. S-U grades optional. Lecs, T R 11:15. E. A. Oltenacu, K. A. Houpt.
The behavior of production species (avian and mammalian) influences the success of any management program. Students study behaviors relating to communication, learning, social interactions, reproduction, and feeding of domestic animals, and their physiological basis. Management systems for commercial livestock production and their implications for animal behavior and welfare are stressed.

BIOAP 313 Histology: The Biology of the Tissues
Spring. 4 credits. Prerequisite: one year of introductory biology. Recommended: BIOBM 330 or 331, or their equivalents; and previous or concurrent enrollment in BIOAP 311. S-U grades optional, with permission of instructor. Evening prelims. Lecs, M W 12:20; labs, M W 1:25–4:25. Staff.
Provides students with a basis for understanding the microscopic, fine-structural, and functional organization of vertebrates, as well as methods of analytic morphology at the cell and tissue levels. Dynamic interrelations of structure, composition, and function in cells and tissues are emphasized. The course may include work with vertebrate animals.

BIOAP 316 Cellular Physiology
Spring. 4 credits. Limited to 72 students, with preference given to students studying in animal physiology. Each lab limited to 36 students. Prerequisite: concurrent or previous enrollment in BIOBM 330 or 331 and 332 or 333. Evening prelims. Lecs, M

W F 11:15; lab, M or T 1:25–4:25.
A. Quaroni and staff.
Lectures introduce students to the most current information on the way cells function and regulate themselves and neighboring cells, and on what molecules are involved in these regulatory processes. Laboratories provide an introduction to cell and organ culture and to immunological techniques used to study cell structure and function *in vivo* and *in vitro*. Experiments performed in the laboratory are closely related to, and provide practical experience with, subjects covered in the lectures. Vertebrate animals are used in this course. No experimentation is performed on live animals.

BIOAP 319 Animal Physiology Experimentation
Fall. 4 credits. Designed for upper-level undergraduate and graduate students studying in physiology, and other students interested in biomedically related professions. Graduate students in the field of Physiology and related fields without equivalent background are strongly encouraged to enroll. Each of 2 afternoon laboratory sections is limited to 40 students. Prerequisite: concurrent or previous enrollment in BIOAP 311 or permission of instructor. Lec, R 12:20; lab, M or W 12:20–5:00 (includes disc section).
E. R. Loew and staff.
A series of student-conducted *in vitro* and *in vivo* experiments designed to illustrate basic physiological processes in animals, with emphasis on relevance to humans, and to introduce students to physiology research techniques, instrumentation, experimental design, and interpretation of results. Techniques include anesthesia, surgical procedures, vivisection under anesthesia, and real-time computer recording and analysis of data. Experiments with living tissues and live animals examine properties of blood, muscle, and nerves; cardiovascular, respiratory, and renal function and their control; and endocrine regulation of renal, cardiovascular, and reproductive tissue activity. Experimental resources include live animals, frogs, rats, rabbits, and sheep which are not always euthanized after the laboratory exercises. Written reports of laboratory activities are required. Grading is based on evaluation of these reports, take-home case studies, laboratory performance, and weekly quizzes.

BIOAP 427 Fundamentals of Endocrinology (also AN SC 427)
Fall. 3 credits. Prerequisite: animal or human physiology or permission of instructor. Lecs, M W F 9:05. P. A. Johnson.
For description, see AN SC 427.

BIOAP 458 Mammalian Physiology
Spring. 3 credits. Enrollment limited. Graduate student auditors allowed. Prerequisite: BIOAP 311 or equivalent. Students not meeting this prerequisite must obtain written permission of instructor in T8 014 Vet Research Tower before the first class. Evening prelims. Lecs, M W F 10:10.
K. W. Beyenbach and staff.
The course offers an in-depth treatment of selected topics in mammalian and human physiology. Emphasis is on concepts and a working knowledge of physiology. Selected topics include: basic functional elements of biological systems; recurrent themes in physiology; design of multicellular animals; mammalian fluid compartments; homeostasis; membrane and epithelial transport; electrophysiology; cardiovascular physiology; gastrointestinal physiology; renal physiology; and acid/base physiology. The lectures incorporate clinical correlations whenever appropriate. Occasional guest lecturers talk about work and careers in basic research and/or clinical medicine. Recommended for biological sciences majors, pre-med and pre-vet students, and beginning graduate students in physiology, nutrition, and animal science.

BIOAP 475 Mechanisms Underlying Mammalian Developmental Defects (also NS 475)
Spring. 3 credits. Prerequisites: BIOBM 330, 331–332, or 333 (may be taken concurrently). M W 9:10; lab, R 2:00.
D. Noden and P. Stover.
For description, see NS 475.

BIOAP 619 Lipids (also NS 602)
Fall. 2 credits. Lecs, T R 11:15.
A. Bensadoun.
Advanced course on biochemical, metabolic, and nutritional aspects of lipids. Emphasis is placed on critical analysis of current topics in lipid methodology; lipid absorption; lipoprotein secretion, molecular structure, and catabolism; molecular biology, function and regulation of lipoprotein receptors; mechanism of hormonal regulation of lipolysis and fatty acid synthesis; and cholesterol metabolism and atherosclerosis.

BIOAP 710–718 Special Topics in Physiology
Fall or spring. 1 or 2 credits for each topic. May be repeated for credit. Enrollment in each topic may be limited. S-U grades optional, with permission of instructor. Lectures, laboratories, discussions, and seminars on specialized topics.

[BIOAP 711 Readings in Applied Animal Behavior
Fall. 1 credit. Prerequisite: BIOAP 311 or equivalent. Offered alternate years. Next offered in 2002. Lec, 1 hour each week TBA. K. A. Houpt.]

BIOAP 712 Thermoregulation and Exercise
Fall. 1 credit. Offered alternate years.
D. Robertshaw.
An examination of the competing demands on the body of exercise and heat exposure with particular emphasis on the cardiopulmonary system and integration of thermoregulatory reflexes.

[BIOAP 713 The Physiology of Ingestive Behavior: Food and Water Intake
Fall. 1 credit. Prerequisite: introductory biology. Next offered in fall 2002.
T. R. Houpt.
A series of 1 to 1.5 hour weekly sessions in which the physiological mechanisms of hunger and thirst, primarily in mammals, will be considered by the group. There will be a mix of background readings, individual reports, and general discussion.]

[BIOAP 714 Cardiac Electrophysiology
Fall. 1 credit. Offered alternate years. Next offered fall 2002. R. Gilmour.
Survey of cardiac potentials, passive membrane properties, ion channels, and cardiac arrhythmias. Emphasis on nonlinear dynamical aspects of cardiac electrophysiology and cardiac arrhythmias.]

[BIOAP 715 Stress Physiology: To Be Discussed as Part of Animal Welfare
Fall. 1 credit. Prerequisite: BIOAP 311 or equivalent required. Offered alternate years. Next offered fall 2002. K. A. Houpt.
The emphasis will be on physiological assessment of stress.]

BIOAP 719 Graduate Research in Animal Physiology (also VETPH 628)
Fall or spring. Variable credit. Prerequisites: written permission of the section chair and of the staff member who supervises the work and assigns the grade. S-U grades optional. Hours TBA. Staff.
Similar to BIO G 499 but intended for graduate students who are working with faculty members on an individual basis.

BIOAP 757 Current Concepts in Reproductive Biology
Fall. 3 credits. Limited to 20 students. Prerequisites: undergraduate degree in biology and a strong interest in reproductive biology. S-U grades optional. Lec/disc, T R 10:10–12:05. Offered alternate years.
J. E. Fortune, W. R. Butler, and staff.
A team-taught survey course in reproductive physiology/endocrinology. Lectures by a number of reproductive biologists on various aspects of male reproductive function (endocrine regulation, testis function, spermatogenesis, and sperm physiology/function); female reproductive function (endocrinology, ovarian development and functions, oocyte physiology/function); fertilization and early embryo development; pregnancy; parturition; puberty; and reproductive technology. Student participation in the form of discussions and/or presentations.

BIOAP 811 Advanced Physiological Methods I
Fall. 2 credits. Enrollment limited. Prerequisites: graduate student status or permission of course coordinator. S-U grades only. Lab TBA. Coordinator: J. Ray.
This is a course for graduate students in physiology and related disciplines. Experiments are carried out in the laboratories of faculty members in the Field of Physiology to acquaint graduate students with the latest techniques/methods in biomedical/physiological research. Three modules are offered each semester by arrangement with the course coordinator.

BIOAP 812 Advanced Physiological Methods II
Spring. 2 credits. Enrollment limited. Prerequisites: graduate student status or permission of course coordinator. S-U grades only. Lab TBA. Coordinator: J. Ray.
This is a course for graduate students in physiology and related disciplines. Experiments are carried out in the laboratories of faculty members in the Field of Physiology to acquaint graduate students with the latest techniques/methods in biomedical/physiological research. Three modules are offered each semester by arrangement with the course coordinator.

Related Courses in Other Departments

Adaptations of Marine Organisms (Biological Sciences [BIOSM] 413)

Advanced Work in Animal Parasitology (Veterinary Microbiology 737)

Animal Development (Veterinary Anatomy 507)

Animal Reproduction and Development (Animal Science 300)

Developmental Biology (Biological Sciences [BIOGD] 385)

Embryology (Biological Sciences [BIOGD] 389)

Fundamentals of Endocrinology (Animal Science 427)

Insect Morphology (Entomology 322)

Integration and Coordination of Energy Metabolism (Biological Sciences [BIOBM] 637 and Nutritional Sciences 636)

Neuroanatomy (Veterinary Anatomy 504)

Sensory Function (Biological Sciences [BIONB] 492)

Teaching Experience (Biological Sciences [BIO G] 498)

Undergraduate Research in Biology (Biological Sciences [BIO G] 499)

BIOCHEMISTRY, MOLECULAR AND CELL BIOLOGY (BIOBM)

BIOBM 132 Orientation Lectures in Biochemistry
Spring, weeks 1–3. No credit. Primarily for freshmen, sophomores, and transfer students. S-U grades only (registered students receive an unsatisfactory grade for nonattendance). Lec, S 10:10–11:00, for first three S of semester. Section chair and staff.
Discussions by six professors about their research and promising areas for research in the future.

BIOBM 232 Milestones In Molecular Biology and Genetics
Spring. 3 credits. Prerequisites: Advanced Placement Biology. Letter grade. Lecs, M W 9:05. Disc, F 9:05. J. M. Lopez.
Lectures cover seminal genetic, biochemical, and cell and molecular biological experiments that were recognized by Nobel prizes. Discussion will focus on current scientific consequences of these seminal findings, together with their societal and/or economic ramifications.

[BIOBM 233 Introduction to Biomolecular Structure (also CHEM 233)
Fall. 2 credits. Limited to 30 students. Prerequisites: CHEM 207–208 or equivalents. Lecs, T R 2:30–3:20. Next offered fall 2002. S. E. Ealick.
This course is intended for students with a basic understanding of chemistry who are considering a program of study in biochemistry. The interrelationship between the structure and function of biologically important molecules is explored. Emphasis is placed on understanding the way in which the three-dimensional arrangements of atoms determine the biological properties of both small molecules and macromolecules such as proteins and enzymes. The study of molecular structure is aided by interactive computer graphics for visualizing three-dimensional structures of molecules.]

BIOBM 321 Numerical Methods in Computational Molecular Biology (see COM S 321)
Fall. 3 credits. Prerequisites: at least 1 course in calculus, such as MATH 106, 111, or 191 and a course in linear algebra, such as MATH 221 or 294 or BTRY 417. No particular course in programming is required, but the student should have some familiarity with iteration, arrays, and procedures.
For course description see COM S 321.

BIOBM 330–332 Principles of Biochemistry
Introductory biochemistry is offered in three formats: individualized instruction (330) and lectures (331 and 332) during the academic year, and lectures (333) during the summer. *Individualized instruction is offered to a maximum of 250 students each semester. Lectures are given fall semester (331), spring semester (332), and summer (333).*

BIOBM 330 Principles of Biochemistry, Individualized Instruction
Fall or spring. 4 credits. Prerequisites: one year of introductory biology for majors and one year of general chemistry and CHEM 257 or 357–358 (CHEM 358 may be taken concurrently) or equivalent, or permission of instructor. Concurrent registration in BIOBM 334 is encouraged. May not be taken for credit after BIOBM 331, 332, or 333. S-U grade optional for graduate students only. Evening prelims: fall, Oct. 11 and Nov. 8; spring, Feb. 26 and Apr. 4. Hours TBA. J. E. Blankenship, P. C. Hinkle, and staff.
Fourteen units that cover protein structure and function, enzymes, basic metabolic pathways, DNA, RNA, protein synthesis, and an introduction to gene cloning. No formal lectures, autotutorial format.

BIOBM 331 Principles of Biochemistry: Proteins and Metabolism
Fall. 3 credits. Prerequisites: one year of introductory biology for majors, one year of general chemistry, and CHEM 257 or 357–358 (CHEM 257 or 357 should not be taken concurrently) or equivalent, or permission of instructor. May not be taken for credit after BIOBM 330 or 333. S-U grades with permission of instructor. Evening prelim: Oct. 25. Lecs, M W F 10:10. G. W. Feigenson.
The chemical reactions important to biology, and the enzymes that catalyze these reactions, are discussed in an integrated format. Topics include protein folding, enzyme catalysis, bioenergetics, and key reactions of synthesis and catabolism.

BIOBM 332 Principles of Biochemistry: Molecular Biology
Spring. 2 credits. Prerequisites: one year of introductory biology for majors and previous or concurrent registration in organic chemistry, or permission of instructor. May not be taken for credit after BIOBM 330 or 333. S-U grades optional, with permission of instructor. Lecs, T R 12:20. B. K. Tye.
A comprehensive course in molecular biology that covers the structure and properties of DNA, DNA replication and recombination, synthesis and processing of RNA and proteins, the regulation of gene expression, and the principles and uses of recombinant DNA technologies.

BIOBM 333 Principles of Biochemistry: Proteins, Metabolism, and Molecular Biology
Summer (8-week session). 4 credits. Prerequisites: one year of introductory biology for majors, one year general chemistry, and CHEM 257, or 357–358, or equivalents, or permission of the instructor. May not be taken for credit after BIOBM 330, 331, or 332. Lecs, M W F 10:00–12:00. S. Ely or H. T. Nivison.
The content of this course is similar to that of BIOBM 330, however, it is presented in lecture format rather than as individualized instruction. The topics include the structure and function of proteins, enzyme catalysis, metabolism, and the replication and expression of genes.

BIOBM 334 Computer Graphics and Molecular Biology
Fall or spring. 1 credit. Prerequisite: concurrent registration in BIOBM 330. If space permits, students who have completed BIOBM 331 or 333 and have either taken or are concurrently taking, BIOBM 332 will be permitted to register during the first week of classes.
J. E. Blankenship, P. C. Hinkle, and staff.
Visualization of complex biomolecules using Silicon Graphics computers. Group presentations on current topics in molecular biology.

BIOBM 407 Nature of Sensing and Response: Signal Transduction in Biological Systems (also PLPA 407)
Spring. 3 credits. Prerequisite: BIOBM 330 or 333 or 331 and previous or concurrent registration in 332. Recommended: BIOGD 281. S-U grades optional. Lecs T R 10:10–11:25. T. P. Delaney.
The responses of organisms and cells to their surroundings are examined to illustrate how biological systems sense their biotic and abiotic environment and communicate sensing into appropriate responses. A wide variety of response systems will be explored to identify their unique features and to illustrate how similar processes are utilized by widely divergent organisms. Examples are drawn from prokaryote, plant, and animal systems for environmental sensing, control of development, and responses during disease. Discussion will also examine the role of genetics and biochemistry in understanding signal transduction pathways, as well as the way these systems are perturbed by mutation and disease.

BIOBM 432 Survey of Cell Biology
Spring. 3 credits. Prerequisite: BIOBM 330, 333, or 331, and previous or concurrent registration in 332, or equivalent. Recommended: BIOGD 281. S-U grades optional for graduate students only. Lecs, M W 8:40–9:55. W. J. Brown, V. M. Vogt.
A survey of a wide array of topics focusing on the general properties of eucaryotic cells. The topics include methods used for studying cells, the structure and function of the major cellular organelles, and analyses of cellular processes such as mitosis, endocytosis, cell motility, secretion, cell-to-cell communication, gene expression, and oncogenesis. Some of the material is covered in greater depth in BIOBM 437; BIOGD 483; and BIOBM 632, 636, and 639.

BIOBM 434 Applications of Molecular Biology to Medicine, Agriculture, and Industry
Fall. 3 credits. Enrollment limited to 36 students. Prerequisites: BIOBM 330 or 333 or 331 and 332. Recommended: BIOGD 281. S-U grades optional. Lecs, M W F 11:15. J. M. Calvo, S. Ely.
Lecture topics include large scale sequencing of genomes, drug discovery based upon genomics, pharmaco-genomics, mapping and cloning human disease genes, DNA and edible vaccines, transgenic animals, engineering

plants resistant to insects, and gene therapy. Discussions will relate to problem sets and to some implications of molecular biology to society.

BIOBM [435]–436 Undergraduate Biochemistry Seminar
435, fall; 436, spring. 1 credit each term. May be repeated for credit. Limited to upperclass students. Prerequistites: BIOBM 330, 333, or 331 and 332 or written permission of instructor. S-U grades only. Seminar time TBA. Organizational meeting first W of each semester at 4 P.M. Next offered fall 2002. Fall: G. P. Hess; spring: staff.
Selected papers from the literature on a given topic are evaluated critically during six or seven two-hour meetings.

BIOBM 437 Eukaryotic Cell Proliferation (also TOX 437)
Fall. Variable credits. Students may take lectures for 2 credits, or take both lectures and discussions for 3 credits. Enrollment for discussion section is limited to 20 students, with preference given to graduate students. Prerequisite: BIOG 101–102 or BIOG 105–106 and BIOBM 330 or BIOBM 331–332. Recommended: BIOGD281 and BIOGM 432. S-U grades optional. Lecs, T R 12:20–1:10. Disc, TBA. R.-H. Chen
The course covers a wide spectrum of issues related to cell proliferation in eukaryotes. Lectures include various aspects of the regulation of cell division cycle and signal transduction pathways, with additional topics on oncogenesis, cell aging, and cell death. The facts as well as concepts and logics behind findings are presented in the lectures. Research articles are analyzed and discussed in depth during discussion section.

BIOBM 438 Seminar in Applied Molecular Biology
Fall. 2 credits. Enrollment limited to 20 students. Prerequisites: BIOBM 330 or 333 or 331, and 332. Recommended: BIOGD 281. S-U grades optional. Sem. R 12:20–2:15. J. Calvo, S. Ely.
A seminar course focusing on topics such as: drugs that extend the life of AIDS patients; applications of human embryonic stem cell technology; genetically engineering plants for resistance to insects; bringing erythropoeitin to market; mining genetic variation within isolated human populations; and benefits from stimulating and blocking angiogenesis. Groups of students will explore the underlying science and will also consider some business and/or social implications for these topics.

BIOBM 439 Molecular Basis of Human Disease
Fall. 2 credits. Prerequisites: BIOBM 330 or BIOBM 331-332 and genetics (e.g., BIOGD 281) or permission from instructor. Recommended: cell biology (e.g., BIOBM 432 or BIOAP 316) and physiology (e.g., BIOAP 311 or BIOAP 458). S-U grades optional. Lecs, T R 11:15. W. K. Krause.
This course will examine how changes in the normal expression, structure, and activity of gene products caused by genetic mutations and environmental agents lead to human diseases. The material will focus on how proteins with modified structures and biochemical activities cause alterations in normal cellular processes, as well as the physiological consequences of these changes. Topics will be selected from hormone insensitivity syndromes, inborn errors of metabolism, gene fusions resulting in hybrid proteins, gene amplification, gene inactivation, disruption of signaling pathways, disruption of metabolic pathways, and the molecular actions of environmental poisons and toxins. Examples of diseases will be selected to emphasize various aspects of cell biology, physiology, and immunology that have been presented in other courses. In addition, the methods used to identify the underlying biochemical and genetic basis of the diseases, as well as possible pharmaceutical and genetic therapies for treating the diseases, will be presented.

BIOBM 440–443 Laboratories in Molecular Biology, Biochemistry, Cell Biology and Molecular Neurobiology
Laboratory instruction in these areas is organized as a set of 2 credit modules, each module is taught for half a semester during the academic year and some modules are taught during the summer. Students may sign up for two courses for a total of 4 credits; limited space is available for students taking only one course for 2 credits. Which courses are offered in each semester depends on scheduling constraints and student preferences. Enrollment limited, with preference given to undergraduates having Biochemistry or Molecular and Cell Biology Programs of Study and to graduate students with a minor in the Field of Biochemistry, Molecular and Cell Biology. Prerequisites: BIOBM 330, or 333, or 331 and previous or concurrent enrollment in 332, or 332 and previous or concurrent enrollment in 331, **and** permission of instructor. **Form to apply for admission to this course is found on the web [http://132.236.135.25/signup.html]; for Fall semester courses, apply from February 15 until one week before CoursEnroll begins; for Spring semester courses, apply from September 15 until one week before CoursEnroll begins**. Confirmation of enrollment status will be sent by e-mail during the week preceding CoursEnroll. Fall and Spring: Labs, M W 12:20–4:25 (disc, F 1:25) or T 9:05–4:25 (disc, R 11:15 or 1:25) or R 9:05–4:25 (disc, T 1:25). Summer (3-week session): M–F 10–5:30.

BIOBM 440 Experimental Molecular Biology
2 credits. S. Ely or H. T. Nivison.
Experiments include cloning of DNA fragments, restriction mapping, DNA sequencing, Southern blotting, and PCR. The experiments emphasize quantitative aspects as well as experimental design.

BIOBM 441 Experimental Proteins and Enzymology
2 credits. S. Ely or H. T. Nivison.
Experiments include purification of enzymes by salt fractionation, ion exchange chromatography, affinity chromatography, determination of kinetic parameters for an enzyme, analysis of proteins by rate zonal sedimentation, SDS-polyacrylamide gel electrophoresis, and immunoblotting.

BIOBM 442 Experimental Cell Biology
Spring only. 2 credits. T. Huffaker.
Experiments include culture of animal cells, purification and analysis of subcellular components, immunofluorescence and electron microscopy, and *in vitro* assays.

[BIOBM 443 Experimental Molecular Neurobiology (also BIONB 430)
Spring. Next offered spring 2003.
D. Deitcher.
Experiments include PCR, cloning of DNA fragments, RNA purification, restriction digests, bacterial transformation, and DNA sequencing. Experiments emphasize how molecular techniques can be applied to studying neurobiological problems.]

BIOBM 450 Lab Projects in Molecular Biology and Biochemistry
Spring. 3 credits. Enrollment limited to 10 students. Prerequisites: 4 credits from any of the following lab courses; BIOBM 440, 441, 442, or 443 plus permission of instructor. Letter grade only. Lab, R 12:20–4:25 plus at least 3 additional lab hours by individual arrangement with the instructor. Disc, F 2:30. S. Ely.
Students work individually on projects of their choice pertaining to a common theme. Skills developed include literature and database searching, project and experimental design, keeping a legal notebook, weekly communication of results, and an oral presentation. Experimental techniques may include site-directed mutagenesis, affinity purification, whole-genome expression systems, molecular evolution of a compound, and exploration of the human genome.

BIOBM 631 Protein Structure and Function
Fall. 3 credits. Prerequisites: BIOBM 330 or 333 or 331 and 332 and organic chemistry. Recommended: physical chemistry. S-U grades optional. Lecs, M W F 9:05.
L. Nicholson.
Presentations on the principles of protein structure and the nature of enzymatic catalysis. Specific topics include protein folding, stability, dynamics and evolution, folded conformations and structure prediction, ligand binding energetics, and the structural basis of catalysis.

BIOBM 632 Membranes and Bioenergetics
Spring. 2 credits. Prerequisite: BIOBM 330 or 333 or 331 and 332 or equivalent. Lecs, T R 11:15. Offered alternate years.
P. C. Hinkle.
Structure and dynamics of biological membranes, physical methods, model membranes, ionophores, ion-transport ATPases, mitochondrial and chloroplast electron transfer chains, and examples of transport from plants, animals, and bacteria. Emphasis given to structure of membrane proteins.

BIOBM 633 Biosynthesis of Macromolecules
Fall. 2 credits. Prerequisite: BIOBM 330 or 333 or 331 and 332. Recommended: BIOGD 281. Lecs, T R 9:05. J. W. Roberts, D. B. Wilson.
Synthesis of DNA, RNA, and proteins, and regulation of gene expression.

BIOBM 636 Advanced Cell Biology
Spring. 2 credits. Prerequisites: BIOBM 330 or 333 or 331 and 332, and 432, or their equivalents. Lec, T R 9:05–9:55.
A. P. Bretscher.
With the availability of whole genome sequences, new families of genes are being identified. It is the goal of functional genomics

to elucidate the role of the gene products in the functional organization of cells. This course provides an integrated view of how this can be achieved employing molecular, genetic, and cell biological approaches. The discussion will center around a detailed discussion of topics such as the cytoskeleton, secretion, endocytosis, cell polarity, and related topics. Together with BIOBM 437, 632, and 639 this course provides broad coverage of the cell biology subject area.

BIOBM 639 The Nucleus
Spring. 2 credits. Prerequisite: BIOBM 330 or 333 or 331 and 332, and 434, or their equivalent. Recommended: BIOGD 281. Lec, T R 10:10. J. T. Lis.
Lectures on topics of eucaryotic gene organization, regulation of gene expression, RNA processing, chromatin structure, the structure and movement of chromosomes, and the architecture of the nucleus. This course covers the structure and function of the nucleus at the molecular and cell biological levels, and together with BIOBM 437, 632 and 636, provides broad coverage of the cell biology subject area.

BIOBM 641 Laboratory in Plant Molecular Biology (also BIOPL 641)
Fall. 4 credits. Prerequisites: BIOGD 281 or equivalent, BIOBM 330 or 331 or equivalent, and permission of instructor. S-U grades with permission of instructor. Lab, T 9:05–4:30. J. B. Nasrallah, M. R. Hanson.
Selected experiments on gene expression, gene transfer, and assay of reporter genes in plants. The course emphasizes the application of molecular biology methodology to plant systems. Additional lab time is required to complete assignments.

BIOBM 730 Protein NMR Spectroscopy (also VETPR 730)
Spring. 2 credits. Prerequisites: CHEM 389 and 390 or CHEM 287 and 288 or permission of instructor. S-U grades optional. Lec TBA. L. K. Nicholson, R. E. Oswald.
The student acquires the tools necessary for in-depth understanding of multidimensional, multinuclear NMR experiments. Schemes for magnetization transfer, selective excitation, water suppression, decoupling, and others are presented. The application of these techniques to proteins for resonance assignment, structure determination, and dynamics' characterization is studied.

BIOBM 732–737 Current Topics in Biochemistry
Fall or spring. 1/2 or 1 credit for each topic. May be repeated for credit. Prerequisite: BIOBM 330 or 333 or 331 and 332 or equivalent. S-U grades only.
Lectures and seminars on specialized topics. Topics for fall and spring to be announced in the division's course supplement published at the beginning of each semester.

BIOBM 738 Macromolecular Crystallography (also CHEM 788)
Spring. 3 credits. S-U grades optional. Prerequisite: permission of instructor. Lecs, M W F 10:10. Offered alternate years. S. E. Ealick.
Lectures briefly cover the fundamentals of crystallography and focus on methods for determining the three-dimensional structures of macromolecules.

BIOBM 751 Ethical Issues and Professional Responsibilities
Spring. 1 credit. Limited to graduate students beyond first year. S-U grades only. Organizational meeting will be held on the first W of the semester. Sem, W 3:35–4:25. Additional sections may be offered. P. Hinkle.
Ethical issues in research and the professional responsibilities of scientists are discussed in a case-study format. Topics to be discussed include: regulations; data selection, manipulation, and representation; fraud, misconduct, and whistle-blowing; conflicts of interest and commitment; authorship, ownership, and intellectual properties; peer review and confidentiality; scientific response to external pressure; legal liabilities; and professional codes of ethics.

BIOBM 761 Topics in Cancer Cell Biology (also VETMM 761)
Spring. Series of 1 credit graduate sections that reflect the "cancer expertise" of the Cornell faculty. (Course Director: Dr. B. U. Pauli).
For description, see VETMM 761.

BIOBM 830 Biochemistry Seminar
Fall or spring. No credit. Sem, F 4:00. Staff.
Lectures on current research in biochemistry, presented by distinguished visitors and staff members. Lectures are open to everyone, but registration is limited to graduate students in Biochemistry, Molecular and Cell Biology.

BIOBM 831 Advanced Biochemical Methods I
Fall. 6 credits. Required of, and limited to, first year graduate students in the Field of Biochemistry, Molecular and Cell Biology. S-U grades only. Labs and discussions 12 hours each week TBA. Organizational meeting first R of semester, 10:10. V. M. Vogt and staff.
The first half of this course comprises an intensive laboratory covering fundamental aspects of modern molecular biology and cell biology. The second half of the course compromises research in the laboratory of a professor chosen by the student (See BIOBM 832). Students must enroll separately for each half.

BIOBM 832 Advanced Biochemical Methods II
Spring. 6 credits. Required of, and limited to, first year graduate students in the Field of Biochemistry, Molecular and Cell Biology. S-U grades only. Lab TBA. Staff.
Research in the laboratories of two different professors chosen by the student. Arrangements are made jointly between the Director of Graduate Studies and the research adviser.

BIOBM 833 Research Seminar in Biochemistry
Fall or spring. 1 credit each term. May be repeated for credit. Required of, and limited to, second-, third-, and fourth-year graduate students majoring in biochemistry. S-U grades only. Sem, M 12:20–1:30. T. C. Huffaker.
Each student presents one seminar per year on his or her thesis research and then meets with instructors and thesis committee members for evaluation.

BIOBM 836–837 Methods and Logic in Biochemistry, Molecular and Cell Biology
836, spring; 837, fall. 1 credit each term. Limited to first-year graduate students majoring in the Field of Biochemistry, Molecular and Cell Biology. S-U grades only. Sem and disc TBA. Fall: G. P. Hess; spring: J. Roberts.
A seminar course with critical discussion by students of original research papers. A variety of topics in biochemistry, molecular and cell biology are covered.

Related Courses in Other Departments

Lipids (Biological Sciences [BIOAP] 619 and Nutritional Sciences 602)

Molecular Aspects of Development (Biological Sciences [BIOGD] 483)

Molecular Biology Techniques for Animal Biologists (Animal Science 650)

Molecular Mechanisms of Hormone Action (Biological Sciences [BIOAP] 658 and Veterinary Medicine 758)

Teaching Experience (Biological Sciences [BIO G] 498)

Undergraduate Research in Biology (Biological Sciences [BIO G] 499)

ECOLOGY AND EVOLUTIONARY BIOLOGY (BIOEE)

BIOEE 154 The Sea: An Introduction to Oceanography (also EAS 104)
Spring. 3 or 4 credits (4-credit option includes one 2 1/2 hour laboratory each week). S-U grades optional. Lecs, T R 11:40–12:55; lab, M or W 2:00–4:25, or M 7:30–9:55 P.M. C. H. Greene, W. M. White.
A survey of the physics, chemistry, geology, and biology of the oceans for both science and non-science majors. Topics include: sea-floor spreading and plate tectonics, marine sedimentation, chemistry of seawater, ocean currents and circulation, the oceans and climate, ocean ecology, coastal processes, marine pollution, and marine resources.

BIOEE 207 Evolution (also HIST 287 and S&TS 287)
Fall or summer. 3 credits. Intended for students with no background in college biology. May not be taken for credit after BIOEE 278. Does not meet the evolutionary biology requirement for the biological sciences major. S-U grades optional. Fall: Lecs, T R 10:10; disc, 1 hour each week TBA. Summer (6-week session): Lecs and discs, M W 6:00–9:00 P.M. W. B. Provine.
Evolution is the central concept in biology. This course examines evolution in historical and cultural contexts. This course aims to understand the major issues in the history and current status of evolutionary biology, and explore the implications of evolution for culture. Issues range from controversies over mechanisms of evolution in natural populations to the conflict between creationists and evolutionists.

BIOEE 261 Ecology and the Environment
Fall or summer. 4 credits. Prerequisite: one year of introductory biology. S-U grades optional. Lecs, M W F 11:15; disc, W or R 1:25, 2:30, or 3:35. N. G. Hairston and staff.
An introduction to the science of ecology, the study of interactions between organisms and their environments. Major topics include demography, succession, biodiversity, biogeochemistry and ecosystems, and the evolution of adaptations. The influences of enemies, competitors, and mutualists on

populations and communities are discussed. The effects of climate and human activities on ecological processes are also considered. Ecological principles are used to explain the issues associated with several environmental problems.

BIOEE 263 Field Ecology

Fall. 3 credits. Limited to 25 students. Prerequisite: concurrent or previous enrollment in BIOEE 261. Lec, R 1:25; lab, F 12:20–4:25; 1 weekend field trip to the Hudson Valley. P. L. Marks.

Field exercises designed to give students direct experience with field work, with emphasis on developing observational skills, journal keeping, and a landscape perspective. Topics include plant succession, niche relationships of insects, influence of herbivores and competition on plant performance, decomposition of soil litter, foraging behavior, census methods, and use of scientific collections.

BIOEE 264 Birds in Biology

Fall. 3 credits. Limited to 25 students. May not be taken for credit after BIOEE 475. Intended primarily for biology nonmajors. S-U grades optional. Lecs and discs, T R 8:40–9:55; 2 field trips TBA. Offered alternate years. A. A. Dhondt.

This course explores exciting new insights in biology using detailed examples drawn from bird studies. Subject matter is suitable for nonmajors, but of interest to majors as well. Topics will be drawn from a variety of biological disciplines. These include behavioral ecology (mating systems, territorial behavior, song), population ecology (migration, population limitation, micro-evolution, competition), evolutionary biology (trade-offs in life histories, optimal clutch size), and conservation biology (habitat fragmentation, inbreeding, acid rain). Lectures will be interspersed with discussion of selected papers.

BIOEE 267 Introduction to Conservation Biology

Fall. 3 credits. May not be taken for credit after NTRES 450. Intended for both science and non-science majors. Completion of BIOEE 267 is not required for NTRES 450. S-U grades optional. Lecs, M W 9:05; disc, F 9:05 or R 2:30; 1 Saturday field trip. A. S. Flecker, J. W. Fitzpatrick.

An exploration of biological concepts related to conserving the earth's biodiversity, introducing ecological and evolutionary principles important for understanding major conservation problems. Topics include patterns of species and ecosystem diversity, causes of extinction, genetic risks of small populations, design of nature preserves, strategies for protecting endangered species, ecosystem restoration, and the value of biodiversity.

BIOEE 274 The Vertebrates: Structure, Function, and Evolution

Spring. 4 credits. Prerequisite: one year of introductory biology. Fee, $25. S-U grades optional. Lecs, M W F 9:05; lab, M T W or R 1:25–4:25. K. R. Zamudio.

An introductory course in vertebrate organismal biology which explores the structure and function of vertebrates with an emphasis on trends in vertebrate evolution. Lectures will cover topics such as the origin and evolution of various vertebrate groups, sensory systems, thermoregulation, life history, locomotion, feeding, size, and scaling. Laboratories include dissections of preserved vertebrate animals and noninvasive live animal demonstrations.

[BIOEE 275 Human Biology and Evolution (also ANTHR 275 and NS 275)

Fall. 3 credits. S-U grades optional, with permission of either instructor. Lecs, M W F 10:10; disc, M 10:10 or TBA. Lecs every W and F; occasional lectures on M. Offered alternate years. Not offered 2001–2002. K. A. R. Kennedy, J. D. Haas.

An introduction to the biology of *Homo sapiens* through an examination of human evolution, biological diversity, and modes of adaptation to past and present environments. Evolutionary theory is reviewed in relation to the current evidence from the fossil record and studies of the evolution of human behavior. A survey of human adaptation covers a complex of biological and behavioral responses to environmental stress. Human diversity is examined as the product of long-term evolutionary forces and short-term adaptive responses. Topics such as creationism, the Piltdown fraud, the sociobiology debate, genetic engineering, race and IQ, and racism are presented as examples of current issues in human biology.]

BIOEE 278 Evolutionary Biology

Fall or spring. 3 or 4 credits. (4-credit option involves writing component and two discussion sections per week; limited to 20 students per section each semester. Students may not preregister for the 4-credit option; interested students complete an application form on the first day of class.) Limited to 300 students. Prerequisite: 1 year of introductory biology or permission of instructor. S-U grades optional. Evening prelims: fall, Sept. 27 and Nov. 1; spring, Feb. 28 and Apr. 2. Lecs, T R 9:05; disc, 1 hour each week TBA. Fall, M. Geber; spring, M. Shulman.

The course considers explanations for patterns of diversity and for the apparent "good fit" of organisms to the environment. Topics covered include the genetic and developmental basis of evolutionary change, processes at the population level, the theory of evolution by natural selection, levels of selection, concepts of fitness and adaptation, modes of speciation, long-term trends in evolution, rates of evolution, and extinction. Students taking the four-credit option read additional materials from the primary literature and write a series of essays in place of the regular prelims.

[BIOEE 371 Human Paleontology (also ANTHR 371)

Fall. 4 credits. Prerequisite: one year of introductory biology or ANTHR 101 or permission of instructor. Lecs, M W F 2:30; lab, 1 hour each week TBA; occasional field trips. Offered alternate years. Not offered 2001–2002. K. A. R. Kennedy.

A broad survey of the fossil evidence for human evolution with special attention to skeletal and dental anatomy, geological contexts, paleoecology, dating methods, archaeological associations, and current theories of human origins and physical diversity.

BIOEE 373 Biology of the Marine Invertebrates

Fall (but course must be taken in the previous summer at the Shoals Marine Laboratory [SML]). 5 credits. Limited to 24 students. Prerequisite: one year of introductory biology for majors. Permission of faculty required because it is off campus. Students in BIOEE 373 are strongly encouraged to take BIOEE 477. Three week, full time course. Daily and evening lectures, laboratories, and field work. Course is taken during the summer; enroll for credit during the subsequent fall semester. Total cost for room, board, and overhead at SML: $1,150. Offered alternate years. C. D. Harvell, J. G. Morin.

An introduction to the biology and evolution of the major invertebrate phyla, concentrating on marine representatives. In addition to the evolution of form and function, lectures cover aspects of ecology, behavior, physiology, chemical ecology, and natural history of invertebrates. The Shoals Marine Laboratory exposes students to a wealth of marine and terrestrial invertebrates in their natural habitats. Regular field excursions allow an excellent opportunity to study freshly collected and *in situ* representatives of most of the major phyla.

BIOEE 405 Biology of the Neotropics

Fall. 2 credits. Prerequisite: introductory biology (majors, non-majors, or equivalent), or permission of instructor. S-U grades optional. Lec and disc, W 7:30–9:30 P.M. P. H. Wrege, A. S. Flecker.

This course is an introductory survey of the biology of the New World tropics, with primary focus on moist lowland forests. The objectives are to learn basic characteristics and phenomena important to understanding neotropical biology, to gain firsthand knowledge of the resources in tropical biology available at Cornell, and to learn how to organize and execute a meaningful seminar presentation.

[BIOEE 452 Herbivores and Plants: Chemical Ecology and Coevolution (also ENTOM 452)

Spring. 3 credits. Prerequisites: one year of introductory biology, BIOEE 261, CHEM 257 or 357/358 and 251 or 301, or permission of instructor. S-U grades optional. Field trips, additional lectures, or laboratory demonstrations may be held in place of F lecture. Lecs, M W F 11:15. Offered alternate years. Not offered 2001–2002. P. P. Feeny.

Topics include: significance of plant chemistry in mediating interactions between plants and herbivorous animals; mechanisms and strategies of plant finding and exploitation by animals, especially insects, and of defense and escape by plants; evolutionary hypotheses for ecological patterns of resistance and attack; and implications for human food and agriculture.]

BIOEE 455 Insect Ecology (also ENTOM 455)

Fall. 3 credits. Prerequisites: BIOEE 261 or equivalent and ENTOM 212 or knowledge of another taxon. S-U grades optional. Lecs, M W F 11:15. Offered alternate years. R. B. Root.

Topics include the nature and consequences of biotic diversity, biogeography, coevolution, adaptive syndromes exhibited by various guilds, population regulation, impact of insects on ecosystems, comparative and functional analysis of communities, and differences in the organization of natural and managed systems. Ecological and evolutionary principles are integrated by thorough study of exemplars.

[BIOEE 456 Stream Ecology (also ENTOM 456 and NTRES 456)
Spring. 4 credits. Limited to 60 students. Recommended: BIOEE 261. S-U grades optional. Field project with lab papers. Lecs, T R 9:05; lab, T W or R 1:25–4:25. Offered alternate years. Not offered 2001–2002. B. L. Peckarsky.
Lecture: addresses the patterns and processes occurring in stream ecosystems, including channel formation; water chemistry; watershed influences; plant, invertebrate, and fish community structure; nutrient cycling; trophic dynamics, colonization, and succession; community dynamics; conservation; and the impacts of disturbances. **Lab:** field projects include descriptive and experimental techniques, hypotheses testing, and writing of scientific papers related to environmental assessment.]

[BIOEE 457 Limnology: Ecology of Lakes, Lectures
Fall. 3 credits. Prerequisite: BIOEE 261 or written permission of instructor. Recommended: introductory chemistry. Letter grade, S-U by permission only. Lecs, M W F 11:15. Offered alternate years. Not offered 2001–2002. N. G. Hairston, Jr.
Limnology is the study of inland fresh waters and other, nonmarine, environments. This course focuses on lakes and ponds, which are discussed as distinct aquatic environments with clear terrestrial boundaries, and within which ecological interactions are especially evident. In lakes, interactions between organisms are often strong and adaptations easily recognized. Physical and chemical properties of the environment impact organisms in important ways and organisms, likewise, influence physics and chemistry. As a result, lakes provide excellent systems for understanding the links between physical (thermal and mixing), chemical (dissolved elements and compounds), and organismal dynamics. Lakes are exciting environments for study in their own right, and for gaining perspective on ecological and evolutionary processes in general.]

[BIOEE 459 Limnology: Ecology of Lakes, Laboratory
Fall. 2 credits. Prerequisite: concurrent or previous enrollment in BIOEE 457. Letter grade, S-U by permission only. Lab, T W or R 1:25–4:25; 1 weekend field trip. Fee, $12 (for food on field trip). Offered alternate years. Not offered 2001–2002. N. G. Hairston, Jr. and staff.
Laboratories and field trips devoted to studies of the biological, chemical, and physical properties of lakes and other freshwater environments. Exercises focus on understanding the freshwater environment, on experimentation, and on understanding ecological processes within lakes. Optional vertebrate dissection (fish) during one laboratory exercise and during a portion of the weekend field trip.]

[BIOEE 460 Theoretical Ecology
Spring. 4 credits. Enrollment limited. Prerequisites: completion of the Biological Sciences mathematics requirement or equivalent, and either one additional semester of mathematics, statistics or modeling (e.g., ABEN 250, ABEN 367, NTRES 305, NTRES 340, NTRES 410, BIONB 422) or permission of instructor. S-U grades optional. Lecs, T R 1:25–2:40; lab, M 2:00–4:25. Offered alternate years. Not offered 2001–2002. S. P. Ellner.
An introduction to the models used to construct ecological theory and analyze data on ecological dynamics, and to the mathematical and computer methods used to analyze these models. Applications from individual decision-making through multispecies and spatial dynamics introduce the main themes in theoretical ecology: optimization, dynamics, and the links between process and pattern. The lab includes instruction in computer programming and review of mathematical methods.]

[BIOEE 462 Marine Ecology (also EAS 462)
Spring. 3 credits. Limited to 75 students. Prerequisite: BIOEE 261. Lecs and discs, M W F 10:10. Offered alternate years. Not offered 2001–2002. C. D. Harvell.
Lectures and discussion focus on current research in broad areas of marine ecology with an emphasis on processes unique to marine systems. A synthetic treatment of multiple levels of organization in marine systems including organismal, population, community, ecosystems, and evolutionary biology. Examples are drawn from all types of marine habitats, including polar seas, temperate coastal waters, and tropical coral reefs.]

[BIOEE 463 Plant Ecology and Population Biology, Lectures
Fall. 3 credits. Prerequisite: BIOEE 261 or 278 or equivalents, or permission of instructor. Recommended: some taxonomic familiarity with vascular plants and concurrent enrollment in BIOEE 465. Lecs, M W F 11:15. Offered alternate years. Not offered 2001–2002. M. A. Geber, P. L. Marks.
This course examines the biological and historical factors affecting the structure of plant communities, and the distribution, abundance, and population dynamics of individual species. The influence of the environment, disturbance history, competition, and herbivory on the organization of plant communities are considered. Plant populations are also studied through an analysis of plant life histories and plant-plant and plant-animal interactions. Throughout the course an attempt is made to blend empirical patterns, experimental results, and theory. Readings are drawn from the primary literature.]

BIOEE 464 Macroevolution
Spring. 4 credits. Limited to 25 students. Prerequisite: BIOEE 278 or permission of instructor. S-U grades optional, with permission of instructor. Lecs, T R 10:10–11:25; disc, 1 hour each week TBA. Offered alternate years. A. R. McCune.
An advanced course in evolutionary biology centered on large-scale features of evolution. Areas of emphasis include patterns and processes of speciation, phylogeny reconstruction, the origin of variation, causes of major evolutionary transitions, and patterns of diversification and extinction in the fossil record. Discussion of these problems involve data and approaches from genetics, morphology, systematics, paleobiology, development, and ecology.

[BIOEE 465 Plant Ecology and Population Biology, Laboratory
Fall. 1 credit. Prerequisite: concurrent enrollment in BIOEE 463. Lab, F 12:05–5:00. Offered alternate years. Not offered 2001–2002. M. A. Geber, P. L. Marks.
Field and laboratory exercises designed to give firsthand experience with the ecology and population biology of plants. Emphasis is on making observations and measurements of plants in the field and greenhouse, and on data analysis.]

[BIOEE 466 Physiological Plant Ecology, Lectures
Spring. 3 credits. Limited to 45 students. Prerequisite: BIOEE 261 or introductory plant physiology. S-U grades optional, with permission of instructor. Lecs, M W 8:40–9:55; optional disc TBA. Offered alternate years. Not offered 2001–2002. Staff.
A detailed survey of the physiological approaches used to understand the relationships between plants and their environment. Lectures explore: physiological adaptation; limiting factors; resource acquisition and allocation; photosynthesis, carbon, and energy balance; water use and water relations; nutrient relations; linking physiology, development, and morphology; stress physiology; life history and physiology; the evolution of physiological performance; and physiology at the population, community, and ecosystem levels. Readings draw from the primary literature and textbooks.]

BIOEE 467 Seminar in the History of Biology (also HIST 415, B&SOC 447, and S&TS 447)
Summer (6-week session). 4 credits. Limited to 18 students. S-U grades optional. W. B. Provine.
Specific topic changes each year.

[BIOEE 468 Physiological Plant Ecology, Laboratory
Spring. 2 credits. Limited to 15 students. Prerequisite: previous or concurrent enrollment in BIOEE 466. Lab, W 1:25–4:25, plus additional lab hours TBA. Offered alternate years. Not offered 2001–2002. Staff.
A detailed survey of the physiological approaches used in understanding the relationships between plants and their environment. Laboratories apply physiological techniques to specific ecological problems and cover aspects of experimental design and computer-aided data analysis. Most laboratories run past the three-hour period, with students spending an average of three hours/week in additional lab time for this course.]

[BIOEE 469 Food, Agriculture, and Society (also B&SOC 469 and S&TS 469)
Spring. 3 credits. Limited to 20 students. Prerequisite: an introductory ecology course or permission of instructor. S-U grades optional. Lecs, T R 1:25–2:40. Not offered 2001–2002. A. G. Power.
A multidisciplinary course dealing with the social and environmental impact of food production in the United States and developing countries. Agroecosystems of various kinds are analyzed from biological, economic, and social perspectives. The impacts of traditional, conventional, and alternative agricultural technologies are critically examined in the context of developed and developing economies. Specific topics include pest management, soil conservation, plant genetic resources, biotechnology, and sustainable development.]

[BIOEE 471 Mammalogy
Fall. 4 credits. Recommended: BIOEE 274. S-U grades optional, with permission of instructor. Carpooling to the Vertebrate

Collections at Cornell Business and Technology Park is necessary several times during the semester. Fee, $15. Lecs, M W F 12:20; lab, M T or W 1:25–4:25; 1 weekend field trip required. Offered alternate years. Not offered 2001–2002. Staff.

Lectures on the evolution, classification, distribution, and adaptations of mammals. Laboratory and fieldwork on systematics, ecology, and natural history of mammals of the world, with primary emphasis on the North American fauna. Systematics laboratories held in the museum at Research Park. Live animals are studied in the field and are sometimes used in the laboratory for nondestructive demonstrations or experiments. The systematics laboratory exercises are based on museum specimens.]

[BIOEE 472 Herpetology

Spring. 4 credits. Limited to 35 students. Recommended: BIOEE 274. S-U grades optional, with permission of instructor. Fee, $30. Lecs, T R 12:20; labs, T R 1:25–4:25; occasional field trips and special projects. Offered alternate years. Not offered 2001–2002. H. W. Greene.

Lectures cover various aspects of the biology of amphibians and reptiles, including evolution, zoogeography, ecology, behavior, and physiology. Laboratory topics include systematics, morphology, and behavior. Live animals are studied in the field and are used in the laboratory for nondestructive demonstrations and experiments. The systematics laboratory exercises are based on museum specimens and dissection of preserved materials.]

[BIOEE 473 Ecology of Agricultural Systems (also CSS 473)

Fall. 3 credits. Limited to 45 students. Prerequisite: BIOEE 261 or permission of instructor. S-U grades optional. During the first 6 weeks of class, the Thursday meetings may run to 5:00 because of field trips. Lecs and discs, T R 2:30–3:45. Offered alternate years. Not offered 2001–2002. A. G. Power, E. C. M. Fernandes.

Analysis of the ecological processes operating in agricultural systems, with an emphasis on the interactions between organisms. Topics include nutrient dynamics in agroecosystems, plant competition and facilitation, intercropping, the ecology of species invasions, mutualism in agroecosystems, plant-herbivore relations, plant-pathogen interactions, biological pest control, and evolutionary processes in agriculture. Case studies from both the tropics and the temperate zone are used to illustrate important concepts.]

[BIOEE 474 Laboratory and Field Methods in Human Biology (also ANTHR 474)

Spring. 5 credits. Limited to 16 students. Prerequisite: one year of introductory biology or ANTHR 101 or permission of instructor. Recommended: permission of instructor by preregistering in E231 Corson. Independent research project required. Lecs and labs, T R 10:10–12:05; additional hours TBA. Offered alternate years. Not offered 2001–2002. K. A. R. Kennedy.

Practical exercises and demonstrations of modern approaches to the methodology of biological anthropology. Emphasis on comparative human anatomy, osteology, description of skeletal subjects, paleopathology, skeletal maturation, and relevant field techniques for the archaeologist and forensic anthropologist.]

BIOEE 475 Ornithology

Spring. 4 credits. Limited to 30 students. Prerequisite: permission of instructor by preregistering in E235 Corson. Recommended: BIOEE 274. S-U grades optional, with permission of instructor. Carpooling to the Vertebrate Collections at Research Park is necessary once a week. Fee, $15. Lecs and labs, T R 12:20–4:25; occasional field trips and special projects. Offered alternate years. D. W. Winkler.

Lectures cover various aspects of the biology of birds, including anatomy, physiology, systematics, evolution, behavior, ecology, and biogeography. Laboratory includes dissection of dead material, studies of skeletons and plumages, and specimen identification of avian families of the world and species of New York. Independent projects emphasize research skills.

[BIOEE 476 Biology of Fishes

Fall. 4 credits. Limited to 24 students. Recommended: BIOEE 274 or equivalent experience in vertebrate zoology. S-U grades optional, with permission of instructor. A small lab fee may be required. Lecs, M W F 10:10; lab, M 1:25–4:25; with additional lab time TBA; 2 field trips. Offered alternate years. Not offered 2001–2002. A. R. McCune.

An introduction to the study of fishes: their structure, evolution, distribution, ecology, physiology, behavior, classification, and identification, with emphasis on local species. Two field trips, including one full day weekend trip required. Live animals are studied in the field and are sometimes used in the laboratory for nondestructive demonstrations or experiments. The systematics and dissection laboratories use preserved specimens.]

BIOEE 477 Marine Invertebrates Seminar

Fall. 1 credit. Prerequisite: BIOEE 373 or permission of instructor. Sem, 1 hour each week TBA. Offered alternate years. C. D. Harvell, J. G. Morin.

Discussions and directed readings center around current research themes in Invertebrate Biology. Designed as an on-campus companion course to the field-based BIOEE 373, Biology of the Marine Invertebrates. Students will write individual research essays based on projects done in the field.

[BIOEE 478 Ecosystem Biology

Spring. 4 credits. Prerequisite: BIOEE 261 or equivalent. S-U grades optional. Lecs and discs, T R 10:10–12:05. Offered alternate years. Not offered 2001–2002. L. O. Hedin.

Analysis of ecosystems in terms of energy flow and nutrient cycles, emphasizing an experimental approach and comparative aspects of terrestrial, freshwater, and marine ecosystems. Consideration of anthropogenic effects on ecosystems, such as from acid precipitation and offshore oil pollution. Analysis of climate change and regional environmental change from an ecosystem perspective.]

BIOEE 479 Paleobiology (also EAS 479)

Fall. 4 credits. Prerequisites: one year of introductory biology for majors and either BIOEE 274, EAS 375, BIOEE 373, or permission of instructor. S-U grades optional. Lecs, M W F 12:20; lab W 2:00–4:25. W. Allmon.

A survey of the major groups of organisms and their evolutionary histories. Intended to fill out the biological backgrounds of earth and atmospheric science students concerning the nature and significance of the fossil record for their respective studies.

BIOEE 490 Topics in Marine Biology

Spring. 2 credits. May be repeated for credit. Primarily for undergraduates. Limited to 15 students. Prerequisite: permission of instructor. S-U grades optional. Lec, F 1:25–3:20. J. Morin and M. Shulman.

Seminar courses on selected topics in marine biology; may include laboratory or field trips. Topics and time of organizational meeting are shown in departmental course offerings listed on the web site.

BIOEE 660 Field Studies in Ecology and Systematics

Fall or spring. Variable credit. Prerequisites: BIOEE 261, a taxon-oriented course, and permission of instructor. S-U grades optional, with permission of instructor. Lecs and field trips TBA. Estimated costs: TBA. Staff.

This course provides students with opportunities to learn field techniques and new biotas by participating in an intensive series of field exercises. Extended field trips may be scheduled during fall break, intersession, or spring break. The regions visited, trip objectives, and other details are announced by the various instructors at an organizational meeting held at the beginning of the semester. Meetings on campus are devoted to orientation and reports on completed projects.

[Section 01: Life Histories of Marine and Freshwater Invertebrates

Fall. 2 credits. Prerequisite: undergraduates must have previous experience or course work with marine or freshwater invertebrates. Two extended weekend field trips in either early September and October or over winter break. Fee, TBA (to help cover transportation and housing). Offered alternate years. Not offered 2001–2002. C. D. Harvell, N. G. Hairston, Jr.

Field trips to either the Shoals Marine Laboratory and Shackelton Point Field Station or to the Coast of Mexico. Students employ experimental approaches to study the evolution of invertebrate life histories.]

Section 02: Graduate Field Course in Ecology

Spring. 3 credits. Restricted to graduate students. A fee will be required to help cover food and lodging for trip to Florida. Offered alternate years. P. L. Marks, R. B. Root.

The course is designed to give graduate students experience in defining questions and designing field investigations. The class is based at the Archbold Biological Station in central Florida over spring break and during the following week. The class visits several ecosystems including sand pine scrub, cattle ranches, cypress swamps, everglades, and coral reefs.

BIOEE 661 Environmental Policy (also ALS 661 and B&SOC 461)

Fall and spring. 3 credits each term. (Students must register for 6 credits each term, since an "R" grade is given at the end of the fall term.) Limited to 12 students. Prerequisite: permission of instructor. Sem, R 2:30–4:30. D. Pimentel.

This course focuses on complex environmental issues. Ten to twelve students, representing several disciplines, investigate significant environmental problems. The research team spends two semesters preparing a scientific report for publication in *Science* or *BioScience*. Thus far, every study has been published.

[BIOEE 665 Limnology Seminar
Spring. 1 credit. May be repeated for credit. Primarily for graduate students; written permission of instructor required for undergraduates. S-U grades optional. Sem TBA. Offered alternate years. Not offered 2001–2002. N. G. Hairston, Jr.
A seminar course on advanced topics in freshwater ecology.]

BIOEE 668 Principles of Biogeochemistry
Spring. 4 credits. Limited to 20 students. Prerequisite: solid background in ecology, environmental chemistry, or related environmental science. Permission of instructor required for undergraduates. S-U grades optional. Lecs and discs, T R 10:10–12:05. Offered alternate years. L. O. Hedin, staff.
Lectures cover the biotic controls on the chemistry of the environment and the chemical control of ecosystem function. Emphasis is on cycles of major elements and minor elements globally and in selected ecosystems, stressing the coupling of element cycles. A comparative approach is used to illustrate similarities and differences in element cycling among ecosystems. Analysis of both theoretical and applied issues, including global atmospheric changes and factors controlling the acidification of lakes and soils.

[BIOEE 669 Plant Ecology Seminar
Spring. 1 credit. May be repeated for credit. Suggested for students majoring or minoring in plant ecology. S-U grades optional. Sem TBA. Not offered 2001–2002. Staff.
Includes review of current literature, student research, and selected topics of interest to participants.]

BIOEE 670 Graduate Seminar in Vertebrate Biology
Fall or spring. 1 credit. May be repeated for credit. Primarily for graduate students; written permission of instructor required for undergraduates. S-U grades only. Sem TBA. Staff.
Seminar presentations and discussions by students on areas of current research in vertebrate biology. Topics vary from semester to semester.

Section 01: Mating Systems, Parentage, and Sexual Selection in Plants and Animals
Fall. 1 credit. Primarily for graduate students; written permission of instructor required for undergraduates. S-U grades only. Sem TBA. K. R. Zamudio, M. A. Geber.

[BIOEE 673 Human Evolution: Concepts, History, and Theory (also ANTHR 673)
Fall. 3 credits. Prerequisite: one year of introductory biology or ANTHR 101 or permission of instructor. Lec, M 2:30; sem and disc, W 7:30–9:30 P.M. Offered alternate years. Not offered 2001–2002. K. A. R. Kennedy.
A survey of the historical background of present-day concepts of human evolutionary variations and adaptations in space and time. The formation of biological anthropology as an area of scientific inquiry within the social and biological sciences is reviewed. Students select their own topics within a broad range of readings in the history of Western concepts of human origins, diversity, and place in nature.]

BIOEE 760 Special Topics in Evolution and Ecology
Fall or spring. 1–3 credits. May be repeated for credit. Enrollment limited. S-U grades optional, with permission of instructor. Hours TBA. Staff.
Independent or group intensive study of special topics of current interest. Content varies and is arranged between student and staff member.

BIOEE 763 Workshop in Biogeochemistry
Fall or spring. 1 credit. May be repeated for credit. Limited to 15 students. Prerequisite: BIOEE 668. S-U grades only. Workshop and disc, TBA. Staff.
Provides a workshop-forum in which graduate students interact with invited world-leaders in biogeochemistry. Workshop topics will change each semester. A one-week workshop will be preceded by seven, one-hour preparatory discussions of readings.

BIOEE 767 Current Topics in Ecology and Evolutionary Biology
Fall. 4 credits. Prerequisite: permission of instructor required for undergraduates. S-U grades only. Lecs and discs, T R 10:10–12:05. Staff.
Critical evaluation and discussion of theory and research in ecology and evolutionary biology. Lectures by faculty and student-led discussions of topics in areas of current importance.

BIOEE 899 M.S. Thesis Research
Fall or spring. 1–15 credits. Prerequisite: admission to the Field of Ecology and Evolutionary Biology. S-U grades optional. Hours TBA. E&EB field faculty.
Thesis research conducted by an M.S. student in the Field of Ecology and Evolutionary Biology with advice and consultation of a major professor who is a member of the Field.

BIOEE 999 Ph.D. Dissertation Research
Fall or spring. 1–15 credits. Prerequisite: admission to the Field of Ecology and Evolutionary Biology as a Ph.D. student. S-U grades optional. Hours TBA. E&EB field faculty.
Dissertation research conducted by a Ph.D. student in the Field of Ecology and Evolutionary Biology with advice and consultation of a major professor who is a member of the Field.

Related Courses in Other Departments

Agricultural and Biological Engineering (ABEN 371, 456)

Anthropology (ANTHR 375)

Biological Sciences (BIO G 400, 498, 499; BIOGD 387, 481, 484; BIOMI 290, 414, 418, BIONB, 221, 422, 427; BIOPL 241, 248, 447, 448)

Biology and Society (S&TS 206, 427)

Crop and Soil Sciences (CSS 260, 366, 415–416, 420)

Earth and Atmospheric Sciences (EAS 101–102, 204, 302, 321)

Entomology (ENTOM 201–215, 331, 453, 470–471)

Natural Resources (NTRES 201–279-271, 301–302, 305, 418–419)

Plant Pathology (PLPA 309, 319)

Shoals Marine Laboratory (BIOSM 303–499)

Statistics (BTRY 101–102, 261, 301, 451; ILRST 210–411)

GENETICS AND DEVELOPMENT (BIOGD)

[BIOGD 184 Understanding Genetics
Spring. 3 credits. May not be taken for credit after BIOGD 281 or 282. This course may be used toward the science distribution requirement of the College of Arts and Sciences and the Group B distribution requirement of the College of Agriculture and Life Sciences. This course may not be used to fulfill the requirements for any program of study in the biological sciences major. S-U grades optional. Lecs, M W F 2:30. Offered alternate years. Next offered 2003. T. D. Fox.
An introduction to genetics for students majoring in fields other than biology. Genetics is a rapidly developing science that is providing insight into all aspects of biology and practical tools which increasingly affect our lives. This course shows how major conclusions about inheritance have been derived from the experimental evidence, drawing on examples from the biology of humans, other animals, plants, fungi, and bacteria. It also illustrates current and future applications of genetic discoveries. For example, the basic principles of inheritance, in conjunction with methods for the isolation and detection of specific gene fragments, is used to understand the detection of genetic diseases and the identification of individuals (DNA fingerprinting). Other topics to be covered include the origin of mutations, use of genetic methods to alter the properties of organisms and the influence of inheritance on behavior.]

BIOGD 281 Genetics
Fall, spring, or summer (8-week session). 5 credits. Not open to freshmen in fall semester. Enrollment may be limited to 200 students. Prerequisite: one year of introductory biology or equivalent. No admittance after first week of classes. Students do not choose lab sections during course enrollment; lab assignments are made during first day of classes. Lecs, T R 10:10–12:05; lab, T or W or R or F 2:30–4:25. Problem-solving sessions strongly recommended, T or W 8:30–9:45 (additional session by arrangement). T. D. Fox, M. L. Goldberg, R. J. MacIntyre.
A general study of the fundamental principles of genetics in eukaryotes and prokaryotes. Discussions of gene transmission, gene action and interaction, gene linkage and recombination, gene structure, gene and chromosome mutations, genes in populations, and extrachromosomal inheritance. Aspects of recombinant DNA technology are discussed. In the laboratory, students perform experiments with microorganisms and conduct an independent study of inheritance in *Drosophila*.

BIOGD 282 Human Genetics
Spring. 2 or 3 credits (2 credits if taken after BIOGD 281). Each discussion limited to 25 students. Prerequisite: 1 year of introductory biology or equivalent; permission of instructor required for students who have taken BIOGD 281. S-U grades optional. Lecs, M W 10:10 (Lecs, also F 10:10 first 3 weeks only); disc, R 10:10 or F 10:10 or 11:15. Staff.
A course designed for nonmajors. Lecturers provide the technical background needed to understand controversial personal, social, and legal implications of modern genetics that are discussed in section meetings.

BIOGD 385 Developmental Biology
Fall. 3 credits. Prerequisite: BIOGD 281. Lecs, M W F 11:15. K. J. Kemphues.
An introduction to the morphogenetic, cellular, and genetic aspects of the developmental biology of animals.

BIOGD 387 Developmental Aspects of Evolution
Fall. 2 credits. Prerequisite: BIOGD 281. S-U grades optional. Lecs, T R TBA. A. W. Blackler.
An examination of the developmental mechanisms that underlie evolutionary change and organismal diversity and of the developmental constraints that contribute to evolutionary conservatism.

BIOGD 389 Embryology
Spring. 3 credits. Preference given to seniors. Prerequisites: 1 year of introductory biology and a knowledge of mammalian adult anatomy. Lecs, T R 10:10; labs, T or R 2–4:25. A. W. Blackler.
A course in the embryonic development of vertebrate animals, with emphasis on the comparative aspects of morphogenesis and function at the tissue and organ levels. The laboratory has a strong morphogenetic bias, emphasizing the comparative aspects of developmental anatomy and preparation for medical studies.

BIOGD 394 Circadian Rhythms (also ENTOM 394 and BIONB 394)
Fall. 2 credits. Prerequisite: ENTOM 212, or BIOGD 281, or BIONB 221 or 222, or permission of instructor. S-U grades optional. Lec, W 7:30–9:10 P.M. Offered alternate years. J. Ewer.
For description, see ENTOM 394.

BIOGD 450 Vertebrate Development
Spring. 3 credits. Prerequisite: introductory biology. S-U and letter grades. Lecs, T R 11:40–12:55. S. Ely.
This course is designed to examine the development of characteristics that make vertebrates unique. The course will start with an introduction to recent evolutionary and molecular approaches to understanding the rise of vertebrate structures. The development of vertebrate structures, such as neural crest, specialized sense organs, and limbs, will be examined in detail with emphasis on the cellular and molecular events controlling their development.

BIOGD 480 Seminar in Developmental Biology
Spring. 1 credit. May be repeated for credit. Limited to juniors and seniors. Prerequisite: BIOGD 281. S-U grades only. Seminar TBA. Staff.

BIOGD 481 Population Genetics
Fall. 4 credits. Prerequisite: BIOGD 281, BIOEE 278, or equivalents. Lecs, M W F 10:10; disc, M 2:30 or T 1:25. C. F. Aquadro.
Population genetics is the study of the transmission of genetic variation through time and space. The class explores how to quantify this variation, what the distribution of variation tells us about the structure of natural populations, and about the processes that lead to evolution. Topics include the diversity and measurement of genetic variation, mating and reproductive systems, selection and fitness, genetic drift, migration and population structure, mutation, multilocus models, the genetics of speciation, quantitative traits, and the maintenance of molecular variation. Emphasis is placed on DNA sequence variation, and the interplay between theory and the data from experiments and natural populations. Specific case studies include the population genetic issues involved in DNA fingerprinting, the genetic structure and evolution of human populations, and the study of adaptation at the molecular level. Examples are drawn from studies of animals, plants, and microbes.

BIOGD 482 Human Genetics and Society
Fall. 4 credits. Enrollment limited to 24 senior biological sciences majors, with preference given to students studying molecular biology and genetics. Prerequisites: BIOGD 281 and BIOBM 330 or 333 or 331 and 332, and permission of instructor. S-U grades optional. Disc, T R 2:30–4:25. R. A. Calvo.
Presentation of some of the science and technology of human genetics, plus discussion of the ethical, social, and legal implications of recent advances in the field. Among the topics considered are assisted reproductive strategies, eugenics, genetic counseling, genetic screening (pre-implantation, prenatal, neonatal, pre-symptomatic, carrier, and workplace), wrongful life and wrongful birth, genetic effects of abused substances, genetics and behavior, human cloning, and therapy for genetic diseases. Students lead many discussions. There is a major writing component to the course.

[BIOGD 483 Advanced Developmental Biology
Spring. 3 credits. Prerequisites: BIOGD 281; BIOBM 332 or 330 or 333; and BIOGD 385 or permission of instructor. Lecs, T R 2:30–4:00. Offered alternate years. Next offered spring 2003. M. F. Wolfner.
An advanced course in developmental biology, with emphasis on the molecular events underlying developmental processes. Simultaneously, a molecular biology course that focuses on how development modulates and uses transcriptional, post-transcriptional, translational, and post-translational regulation of gene expression and cellular events such as signal transduction and cell-cell communication. Numerous developmental systems are discussed and analyzed in microorganisms, plants and, especially, animals including fruit flies, nematode worms, and vertebrates such as mice, frogs, and humans. Course readings include original research articles. Discussion emphasizes specific experiments and approaches, and results and their interpretation.]

BIOGD 484 Molecular Evolution
Spring. 3 credits. Prerequisites: BIOGD 281 and organic chemistry. Lecs, M W 8:40–9:55. Offered alternate years. R. J. MacIntyre.
An analysis of evolutionary changes in genes and their protein products. Theories on the evolution of the genetic code, the construction of phylogenetic trees from biochemical data and the role of gene duplications in evolution are discussed. The second half of the course concerns the evolution and the organization of genomes from viruses to higher eukaryotes, including the evolution of satellite DNA sequences and transposable elements.

[BIOGD 485 Bacterial Genetics (also BIOMI 485)
Fall. 2 credits. Graduate students, see BIOMI 685. Prerequisite: BIOGD 281. Recommended: BIOMI 290 and BIOBM 330 or 331 and 332 or 333. Lecs, W 7:30–9:25 P.M. Next offered fall 2002. Staff.
For course description, see BIOMI 485.]

[BIOGD 486 Advanced Eukaryotic Genetics
Spring. 4 credits. Enrollment may be limited to 50 students. Prerequisites: BIOGD 281, BIOBM 330 or 333 or 331 and 332. S-U grades optional. Lecs, T 12:20–2:15 and R 12:20–1:10; disc R 1:25–2:15 or F 11:15–12:05. Next offered spring 2003. E. E. Alani.
The course develops fundamental skills in eukaryotic genetic analysis through lectures and by reading, analyzing, and presenting research articles. Concepts are presented within the context of a well-studied field, such as chromosome segregation. The basic tools that have been developed to study this field are used to analyze other topics such as vegetative and meiotic cell cycle control, embryonic development, pathogen resistance in plants, and human genetics.]

[BIOGD 600 Development of Sensory Systems
Spring. 2 credits. Prerequisites: introductory biology, genetics, development, and neurobiology, or permission of instructor. S-U or letter grades. Lec, M 7:00–8:40 P.M. Offered alternate years. Next offered spring 2003. K. Whitlock.
This course will explore the unique and shared mechanisms used in sensory system development of both vertebrates and invertebrates. The first class of the course will provide a general introduction to the development of sensory systems in vertebrates and invertebrates. Following classes will involve the reading of current and classic papers in sensory system development. Students will choose a topic and articles from a list provided by the instructor. Students will be responsible for an oral presentation and short paper.]

BIOGD 682 Fertilization and the Early Embryo
Spring. 2 credits. Prerequisites: BIOGD 281; BIOBM 332, 330 or 333; and BIOGD 385 or permission of instructor. Lec, R 2:30–4:25. Offered alternate years. M. F. Wolfner.
This course treats the earliest events in the formation of a new organism. The methods and findings of genetic, developmental, and molecular analyses are discussed. Readings in the recent literature and discussions focus on pre-gastrulation embryos from several animal species. Topics include fertilization (sperm/egg binding, sperm entry into egg), pro-

nuclear fusion, egg activation, initiation and terminating the cleavage, division period, cytoplasmic determinants, and changes in nuclear and cytoplasmic architecture.

[BIOGD 684 Advanced Topics in Population Genetics
Spring. 2 credits. Limited to 20 students. Prerequisites: BIOGD 481 or equivalent and written permission of instructor. S-U grades optional. Lec, T 2:30–4:25. Offered alternate years. Not offered 2001–2002. Next offered spring 2003. C. F. Aquadro.
An in-depth exploration of current areas of research in population genetics. Readings primarily from recent books and the current literature. Specific topics are announced the previous fall and in the division's catalog supplement. Format includes lectures, discussion, and presentations by students.]

[BIOGD 685 Advanced Bacterial Genetics (BIOMI 485)
Fall. 2 credits. Limited to graduate students in Biological Sciences; see BIOMI 485. Prerequisites: BIOGD 281 or equivalent, BIOBM 330 or 331 and 332 or equivalent, and permission of instructor. Recommended: BIOMI 290 or equivalent. Lec, W 7:30–9:25; disc, R 10:10–11:00. Not offered 2001–2002. Next offered fall 2002. Staff.
For course description, see BIOMI 685.]

[BIOGD 687 Developmental Genetics
Fall. 2 credits. Limited to 20 students. Prerequisites: BIOGD 281 and 385 or their equivalents. S-U grades optional. Lec TBA. Offered alternate years. Not offered 2001–2002. K. J. Kemphues.
Selected topics focus on the use of genetic analysis in understanding mechanisms of development. Topics are drawn primarily from studies in fruitflies, nematodes, mice and fish. Possible topics include pattern formation, cell lineage, neural development, maternal information in development, germ cell development, sex determination, and intercellular communication. Students read current literature and are encouraged to discuss each topic in class.]

BIOGD 780 Current Topics in Genetics
Fall or spring. 2 credits. May be repeated for credit. Primarily for graduate students, with preference given to majors in the Field of Genetics, written permission of instructor required for undergraduates. Limited to 20 students. No auditors. S-U grades optional, with permission of instructor. Seminar TBA. Staff.

BIOGD 781 Problems in Genetics and Development
Fall. 2 credits. Limited to first-year graduate students in the Field of Genetics and Development. Disc TBA. Staff.
An introduction to the research literature in selected areas through weekly problem sets and discussions.

BIOGD 782–783 Current Genetics/ Development Topics
Spring. 1/2 or 1 credit for each topic. May be repeated for credit. S-U grades only. Lectures and seminars on specialized topics to be announced. Staff.

BIOGD 786 Research Seminar in Genetics and Development
Fall and spring. 1 credit. Limited to and required of second-, third-, and fourth-year graduate students in Genetics and Development. S-U grades only. Sem, W 12:20–1:30. Staff.
Each graduate student presents one seminar per year based on his or her thesis research. The student then meets with the thesis committee members for an evaluation of the presentation.

BIOGD 787 Seminar in Genetics and Development
Fall and spring. 1 credit. Limited to graduate students in Genetics and Development. S-U grades only. Sem, M 4–5:00. Staff.
Seminars in current research in genetics and developmental biology conducted by distinguished visitors and staff.

Related Courses in Other Departments

Advanced Plant Genetics (Plant Breeding 606)

Animal Development (Veterinary Anatomy 507)

Biosynthesis of Macromolecules (Biological Sciences [BIOBM] 633)

Current Topics in Biochemistry (Biological Sciences [BIOBM] 731–736)

Evolutionary Biology (Biological Sciences [BIOEE] 278)

Laboratory in Molecular Biology and Genetic Engineering of Plants (Biological Sciences [BIOPL] 347)

Laboratory in Plant Molecular Biology (Biological Sciences [BIOPL] 641)

Molecular Biology and Genetic Engineering of Plants (Biological Sciences [BIOPL] 343)

Plant Cytogenetics (Plant Breeding 446)

Plant Genome Organization (PLBR 653–03)

Plant Growth and Development (Biological Sciences [BIOPL] 644)

Plant Molecular Biology I (Biological Sciences [BIOPL] 653)

Plant Molecular Biology II (Biological Sciences [BIOPL] 652)

Protein-Nucleic Acid Interactions (Biological Sciences [BIOMI] 692)

The Nucleus (Biological Sciences [BIOBM] 639)

Undergraduate Research in Biology (Biological Sciences [BIO G] 499)

Molecular Neurobiology BIONB 420/720 (also BIOBM 435/735)

MICROBIOLOGY (BIOMI)

BIOMI 192 Microorganisms on the Planet Earth
Summer. 3 credits. May not be taken for credit after BIOMI 290. S-U grades optional. Lecs, M-F 10:00–11:15. R. P. Mortlock.
A course in microbiology designed to introduce students, who have a limited background in science, to the microorganisms that populate our planet earth. Among the microorganisms studied are the bacteria, the archaebacteria, some of the single-celled plants and animals, and the viruses. Topics covered are the basic nature of microorganisms, their evolution on earth, their composition and growth, their role in the ecology of this planet, their role in human history and disease, and their use in bioengineering. This course is not a prerequisite for advanced courses in microbiology.

BIOMI 290 General Microbiology Lectures
Fall, spring, or summer (6-week session). 2 or 3 credits (2 credits if taken after BIOMI 192). Prerequisites: 1 year of introductory biology for majors and 1 year of college chemistry, or equivalent. Recommended: concurrent registration in BIOMI 291. Lecs, M W F 11:15. Staff.
A comprehensive overview of the biology of microorganisms, with emphasis on bacteria. Topics include microbial cell structure and function, physiology, metabolism, genetics, diversity, and ecology. Applied aspects of microbiology are also covered such as biotechnology, the role of microorganisms in environmental processes, and medical microbiology.

BIOMI 291 General Microbiology Laboratory
Fall or spring, 2 credits. Summer (6-week session), 2 credits. Prerequisite: concurrent or previous enrollment in BIOMI 290. Lec, F 12:20; labs, M W 12:20–2:15 or 2:30–4:25, or T R 10:10–12:05, 12:20–2:15, or 2:30–4:25. C. M. Rehkugler.
A study of the basic principles and techniques of laboratory practice in microbiology, and fundamentals necessary for further work in the subject.

BIOMI 292 General Microbiology Discussion
Spring. 1 credit. Prerequisite: concurrent or previous enrollment in BIOMI 290. S-U grades only. Disc TBA. C. M. Rehkugler.
A series of discussion groups in specialized areas of microbiology to complement BIOMI 290.

BIOMI 331 General Parasitology (also VETMI 331)
Spring. 2 credits. Prerequisites: one year of introductory biology. Lecs, T R 3:35–4:25. D. Bowman.
An introduction to the basic animal parasites, stressing systematics, taxonomy, general biology, ecological interactions, and behavior of non-medically important groups. The course will introduce the major animal parasites, protozoan, nematode, platyhelminth, acanthocephalan, annelid, and arthropod.

BIOMI 391 Advanced Microbiology Laboratory
Fall. 3 credits. Prerequisites: BIOMI 290, 291, and BIOBM 330 or 331 or 333. Preference given to biological sciences students in the microbiology program of study. Lab, M W 1:25–4:25; disc, F 1:25. J. B. Russell, W. C. Ghiorse, J. P. Shapleigh, S. H. Zinder.
A laboratory course that illustrates basic principles of experimental microbiology. The course is organized into four modules which last three weeks each: (1) ecology, (2) physiology, (3) genetics, and (4) structure and function. Students are encouraged to take this course during their third year of study.

BIOMI 394 Applied and Food Microbiology (also FOOD 394)
Fall. 2–3 credits. Prerequisites: BIOMI 290–291. M W F 12:20–1:10. C. A. Batt.
Microorganisms play a central role in a variety of food, agricultural, and environmental processes. This course will present a comprehensive survey of the roles that microorganisms play in industrial/biotechnological processes as well as their importance in the safety and production of foods. Issues

related to the biochemistry, genetics, and physiology of microorganisms important in these processes will be reviewed. A two-credit core section on food microbiology is complemented by a one-credit section on industrial/biotechnology applications.

BIOMI 397 Environmental Microbiology (also CSS 398)
Fall. 3 credits. Prerequisites: BIOES 261 or BIOMI 290 or CSS (SCAS) 260 or permission of instructor. Lecs, M W F 10:10. W. C. Ghiorse, E. L. Madsen.
The biological properties, evolution, and behavior of microorganisms in natural systems are discussed in relation to past and present environmental conditions on Earth and other living planets. The functional role of microorganisms in ecologically and environmentally significant processes is also considered through discussion of specific topics such as nutrient and toxic elemental cycles, transformation of pollutant chemicals, wastewater treatment, environmental biotechnology, and astrobiology.

[BIOMI 404 Pathogenic Bacteriology and Mycology (also VETMI 404)
Spring. 2 or 3 credits (3 credits with lecture and seminar with permission of instructor for undergraduates). Prerequisites: BIOMI 290 and 291. Strongly recommended: BIO G 305. Lecs, M W 10:10; sem, F 10:10. Offered alternate odd years. Not offered 2001–2002. D. Debbie.
This is a course in medical microbiology, presenting the major groups of bacterial and mycotic pathogens important to human and veterinary medicine. The emphasis of this course is infection and disease pathogenesis. Topics include disease causality; interactions of host, pathogen and environment, including immunity to bacteria and fungi; and principles of antimicrobial therapy and drug resistance. A companion seminar addresses the current and classic literature related to microbial pathophysiology on the cellular and molecular level.]

BIOMI 408 Viruses and Disease I (also VETMI 408)
Spring. 2 credits. Prerequisites: BIOMI 290, 291; BIO G 305; and permission of instructor. Recommended: BIOGD 281. Lecs, M W 7:30 P.M. Offered alternate even years. J. Casey.
The course covers basic concepts in virology with emphasis on virus-host interactions, strategies for gene regulation, and mechanisms of pathogenicity. Selected viral infections that result in immune dysfunction and neoplasis are highlighted in the context of approaches to prevent or reduce the severity of diseases.

[BIOMI 409 Viruses and Disease II (also VETMI 409)
Fall. 2 credits. Prerequisites: BIOMI 290 and 291. Recommended prerequisites: BIOMI 408, BIOBM 330–332, BIOBM 432. Lecs, T R 2:30–3:20 P.M. Offered alternate even years. G. Whittaker.
This course will be complementary to BIOMI 408, Viruses and Disease I, and will emphasize RNA viruses. The course will be complete in its own right. As such, completion of BIOMI 408 is not a requirement, but is encouraged. The structure and classification of viruses, virus entry, genome replication and assembly will be studied with particular emphasis on virus-host cell interactions. Vaccination, chemotherapy and evolution of viruses will also be discussed.]

[BIOMI 414 Bacterial Diversity
Spring. 3 credits. Prerequisites: BIOMI 290, and 291, BIOBM 330 or 331 or 333 recommended. Lecs, M W F 11:15. Offered alternate odd years. Next offered spring 2003. S. H. Zinder.
A consideration of the evolutionary biology, physiology, ecology, genetics, and practical potential of important groups of bacteria. Topics include molecular methods for determining bacterial phylogeny, the evolution of diverse mechanisms of energy conservation, fixation of carbon and nitrogen, and adaptation to extreme environments.]

BIOMI 416 Bacterial Physiology
Spring. 3 credits. Prerequisites: BIOMI 290, 291, and BIOBM 330 or 331 or 333, or their equivalents. Lecs, M W F 11:00. Offered alternate even years. J. P. Shapleigh.
The focus of the course is on physiological and metabolic functions of bacteria. Consideration is given to chemical structure, regulation, growth, and energy metabolism. Special attention is given to those aspects of bacterial metabolism not normally studied in biochemistry courses.

BIOMI 417 Medical Parasitology (also VETMI 431)
Fall. 2 credits. Prerequisites: courses pertaining to zoology and biology. Lecs, T R 3:35–4:25. D. Bowman.
A systematic study of anthropod, protozoan, and helminth parasites of public health importance with emphasis on epidemiologic, clinical, and zoonotic aspects of these parasitisms.

BIOMI 418 Microbial Ecology
Spring. 3 credits. Prerequisites: BIOMI 290 and 291, or BIOMI 398 and instructor's permission, and BIOBM 330 or 331 and 332. Lecs, M W F 10:10–11. E. R. Angert.
Understanding the role of microorganisms in natural environments is one of the greatest challenges facing microbiologists. This course will introduce current biochemical and macromolecule sequence-based methods to assess community diversity and microbial activity in a variety of ecosystems. Other topics discussed include bacterial growth and survival, population biology, and microbial interactions.

[BIOMI 420 Microbial Genomics
Spring. 2 credits. Prerequisites: BIOMI 290, BIO G 281, BIOBM 330, or equivalent. Lecs, T R 10:10–11:00. Offered alternate odd years. Not offered 2001–2002. J. P. Shapleigh and J. D. Helmann.
Genomic information is revolutionizing biology. We will discuss the impact of genomic information on the study of microbial physiology, evolution, and biotechnology. Topics will include both techniques (automated DNA sequencing, assembly, annotation, DNA chips) and applications (genome-wide analysis of transcription, functional genomics).]

[BIOMI 485 Bacterial Genetics
Fall. 2 credits. Graduate students, see BIOMI 685. Prerequisite: BIOGD 281. Recommended: BIOMI 290 and BIOBM 330 or 331 and 332 or 333. Lecs, W 7:30–9:25 P.M. Not offered 2001–2002. Staff.
Concepts and principles of formal genetic analysis as applied to prokaryotes, with emphasis on enterobacteria and their viruses. Topics include mutagenesis and isolation of mutants; genetic exchange, recombination and mapping; complementation, epistasis and suppression; transposons; gene expression and regulation; and genetics of bacterial pathogenesis.]

BIOMI 610 Introduction to Chemical and Environmental Toxicology (also TOX 610)
Fall. 3 credits. Prerequisite: graduate standing in the field or consent of the instructor. Letter grades. Lec, M W F 11:15–12:05. A. Hay.
Introduction to the general principles of toxicology including the sources, mechanisms, and targets of toxic agents. Special attention will be given to the interaction between toxic agents and biological systems at both the organismal and ecological level. The effects of both anthropogenic and natural toxins will be examined with respect to genetic and developmental toxicity as well as carcinogenesis and specific organ toxicity.

BIOMI 652 (Section 02) Molecular Plant-Microbe Interactions (BIOPL 652, Sec 02)
Spring. 1 credit. Prerequisites: BIOGD 281, BIOBM 330 or 331 or 333, and BIOPL 653 (section 01) or their equivalents. S-U grades optional. Lecs, M W F 12:20 (12 lecs) Jan. 21-Feb. 15. S. C. Winans.
For course description, see BIOPL 652, Sec 02.

BIOMI 690 Prokaryotic Biology
Fall and spring. 4 weeks/8 lectures. 1 credit/section to be offered. T R. Time TBA.

Section 1—Microbial Structure and Function
Fall. J. P. Shapleigh.
Discussion of those macromolecules and assemblages of macromolecules that together define the structure of the prokaryotic cell. This will include external structures, such as cell wall, flagella, pili, and peptidoglycan and internal structures such as specialized vesicles and other large complexes.

Section 2—Microbial Genetics
Fall. J. D. Helmann.
Reviews the fundamental concepts of microbial genetics including mutations and their analysis, plasmids, conjugation, transformation, transduction, transposition, recombination, repair, and mutagenesis.

Section 3—Microbial Physiology/Diversity
Fall. S. H. Zinder.
The major energy conserving modes of metabolism and their phylogenetic distributions among both bacteria and archaea are reviewed. Topics include fermentation, respiration, photosynthesis, and pathways of carbon and nitrogen fixation.

Section 4—Microbial Pathogenesis
Spring. S. C. Winans.
An introduction to the fundamental concepts of bacterial pathogenesis including the normal flora, pathogen entry and colonization, the production and regulation of toxins, horizontal transfer of pathogenesis determinants, and the roles of both specific and nonspecific host defenses. Examples will include bacterial pathogens of both animals and plants.

Section 5—Environmental Microbiology
Spring. E. L. Madsen.
A core course of concepts, methods, and current literature that reveals the multidisciplinary nature of environmental microbiology and its relationship to prokary-

otic biology. The crucial roles that microorganisms play in catalyzing biogeochemical reactions throughout the biosphere will be discussed.

BIOMI 791 Advanced Topics in Microbiology
Fall or spring. 1 credit. May be repeated for credit. Prerequisite: graduate standing in microbiology. S-U grades only. Disc TBA. S. C. Winans, E. R. Angert.
Reading and presentation by graduate students of current literature in selected areas of modern microbiology.

BIOMI 795–796 Current Topics in Microbiology
Fall, 795; spring, 796. 1/2 or 1 credit for each topic. May be repeated for credit. Designed primarily for graduate students in microbiology. Prerequisite: upper-level courses in microbiology. S-U grades only. Lecs TBA. Staff.
Lectures and seminars on special topics in microbiology.

BIOMI 797 Scientific Communication Skills
Fall and spring. 1 credit each semester. F 2:30–3:20.
The ability to communicate effectively is essential for success as a scientist. The primary goal of this course is to provide students with an opportunity to develop self-confidence and refine their formal oral presentation skills. Students will be asked to present topical seminars that will be critically evaluated by the instructor. Feedback for improving the presentation and peer evaluations will be emphasized. Taken by students in the Graduate Field of Microbiology during their first two semesters, a third semester is optional.

BIOMI 798 Graduate Research Seminar in Microbiology
Fall and spring. 1 credit each semester. Required of all graduate students in the Graduate Field of Microbiology. S-U grades only. F 1:25–2:15. Staff.
All graduate students in the Field of Microbiology are required to attend BIOMI 798 and are required to present a seminar concerning their research at least once each year.

BIOMI 799 Microbiology Seminar
Fall and spring. Required of all graduate students in the Graduate Field of Microbiology and open to all who are interested. Sem TBA. Staff.

Related Courses in Other Departments

Advanced Food Microbiology (Food Science 607)

Advanced Immunology Lectures (Biological Sciences [BIO G] 705 and Veterinary Microbiology 705)

Advanced Work in Bacteriology, Virology, or Immunology (Veterinary Microbiology 707)

Bacterial Plant Diseases (Plant Pathology 647)

Basic Immunology, Lectures (Biological Sciences [BIO G] 305 and Veterinary Microbiology 315)

Ecology of Soil-Borne Pathogens (Plant Pathology 644)

Food Microbiology, Laboratory (Food Science 395)

Food Microbiology, Lectures (Food Science 394)

Immunology of Infectious Diseases and Tumors (Biological Sciences [BIO G] 706 and Veterinary Microbiology 719)

Introduction to Scanning Electron Microscopy (Biological Sciences [BIO G] 401)

Introductory Mycology (Plant Pathology 309)

Light and Video Microscopy for Biologists (Biological Sciences [BIO G] 450)

Limnology: Ecology of Lakes, Lectures (Biological Sciences [BIOEE] 457)

Magical Mushrooms, Mischievous Molds (Plant Pathology 201)

Microbiology for Environmental Engineering (Civil and Environmental Engineering 451)

Plant Virology (Plant Pathology 645)

Principles of Biogeochemistry (Biological Sciences [BIOEE] 668)

The Soil Ecosystem (Crop and Soil Science 366)

NEUROBIOLOGY AND BEHAVIOR (BIONB)

BIONB 111 Brain Mind and Behavior (also PSYCH 111 and COGST 111)
Spring. 3 credits. Intended for freshmen and sophomores in the humanities and social sciences; junior and senior non-biology majors by permission only. Letter grades only. Lecs, M W F 9:05. E. Adkins Regan and R. R. Hoy.
See COGST 111 for description.

BIONB 221 Neurobiology and Behavior I: Introduction to Behavior
Fall. 3, 4, or 5 credits (4 credits with one discussion per week; 5 credits with two discussions per week and participation in the Writing in the Majors program). 4- or 5-credit option required of students in the neurobiology and behavior program of study. Each 4-credit discussion section is limited to 20 students, with preference given to students studying neurobiology and behavior. Enrollment in the 5-credit option is limited to 12 students. Students may not preregister for the 5-credit option; interested students complete an application form on the first day of class. Not open to freshmen. Prerequisite: 1 year of introductory biology for majors. May be taken independently of BIONB 222. S-U grades optional. Lecs, M W F 12:20; disc TBA. P. W. Sherman and staff.
A general introduction to the field of behavior. Topics include evolution and behavior, behavioral ecology, sociobiology, chemical ecology, communication, rhythmicity, orientation and navigation, and hormonal mechanisms of behavior.

BIONB 222 Neurobiology and Behavior II: Introduction to Neurobiology
Spring. 3 or 4 credits (4 credits with discussion and written projects). 4-credit option required of students studying neurobiology and behavior. Each discussion limited to 20 students, with preference given to students studying neurobiology and behavior. Not open to freshmen. Prerequisites: 1 year of introductory biology for majors and 1 year of chemistry. May be taken independently of BIONB 221. S-U grades optional. Lecs, M W F 12:20; disc TBA. A. H. Bass and staff.
A general introduction to the field of cellular and integrative neurobiology. Topics include neural systems, neuroanatomy, developmental neurobiology, electrical properties of nerve cells, synaptic mechanisms, neurochemistry, motor systems, sensory systems, learning, and memory. Some discussion sections include dissections of preserved brains.

[BIONB 322 Hormones and Behavior (also PSYCH 322)
Fall. 3 credits; 2 lectures plus a section in which students will read and discuss original papers in the field, give an oral presentation, and write a term paper. Limited to juniors and seniors. Prerequisite (1 of the following): PSYCH 223, or BIONB 221, or BIONB 222, or one year of introductory biology plus a course in psychology. Letter grades only. Lec M W F 11:15. Not offered 2001–2002. E. Adkins Regan.
See PSYCH 322 for description.]

BIONB 324 Biopsychology Laboratory (also PSYCH 324)
Fall. 4 credits. Limited to 20 upperclass students. Prerequisites: laboratory experience in biology or psychology, BIONB 221 and 222 or PSYCH 123 and 222; and permission of instructor. Labs, T R 1:25–4:25. T. DeVoogd.
See PSYCH 324 for description.

BIONB 325 Neurodiseases—Molecular Aspects
Fall. 3 credits. Prerequisites: two courses from BIONB 222, BIOGD 281, BIOBM 330, or 331; co-registration in one of the two is acceptable. S-U grades optional. Lecs, T R 9:05; disc, T 1:25, 2:30, or 3:35. T. R. Podleski.
The intent of this course is to teach students how to use recombinant DNA techniques for the study of neurodiseases. How are genes responsible for diseases identified and how are the functions of these genes studied? Attention is focused on those neural diseases in which significant advances have been made using these techniques, for example, Alzheimer's, Huntington's, Prion diseases, schizophrenia, depression, disorders affecting ion channels, and muscular dystrophies. Emphasis is placed on how these studies provide a useful approach to studying the mammalian nervous system by exposing the functions of genes that would be difficult to identify in other ways.

BIONB 326 The Visual System
Spring. 4 credits. Prerequisite: BIONB 222 or BIOAP 311, or permission of instructor. S-U grades optional. Lecs, M W F 10:10; disc, 1 hour each week TBA. Offered alternate years. H. C. Howland.
The visual systems of vertebrates are discussed in breadth and depth as well as some aspects of invertebrate vision. Topics covered include the optics and anatomy of eyes, retinal neurophysiology, structure and function of higher visual centers, ocular motility and ocular and visual system development.

BIONB 327 Evolutionary Perspectives on Human Behavior
Fall. 3 credits. Prerequisites: BIONB 221 and permission of instructor required. Letter grades only. T R 2:55–4:10. S. T. Emlen.
A Socratically taught, discussion-based course dealing with evolutionary perspectives on human behavior. Each fall a different topic is selected for study. All class members read and discuss primary papers and recent books. Each student is responsible for leading

multiple discussions, for writing an original paper, and for peer-reviewing papers of other class members.

BIONB 328 Biopsychology of Learning and Memory (also PSYCH 332)
Spring. 3 credits. Prerequisites: 1 year of biology and either a course in biopsychology or BIONB 222. S-U grades optional. Lecs, M W F 11:15. T. DeVoogd.
See PSYCH 332 for description.

BIONB 329 Ecology of Animal Behavior (also BIOSM 329)
Summer. 4 credits. Prerequisite: 1 year of introductory college biology. Recommended: course work in ecology, psychology, or behavior. S-U grades optional. A special 2-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 2 weeks. SML faculty.
See BIOSM 329 for description.

[BIONB 392 Drugs and the Brain
Spring. 4 credits. Prerequisites: BIONB 222 or equivalent course in neurobiology with permission of instructor. A knowledge of biochemistry is useful but not required. S-U grades optional. T R 10:10–11:25; disc TBA. Offered alternate years. Not offered 2001–2002. R. Harris-Warrick.
An introduction to neuropharmacology, with an emphasis on the neural mechanisms of psychoactive drugs. Topics include a brief introduction to neuropharmacology and a discussion of the major neurotransmitter families. The rest of the course will cover the major psychoactive drugs, including cocaine, heroin, psychedelics, marijuana and alcohol, as well as pharmaceuticals for the treatment of anxiety, schizophrenia and depression. The course will include a term paper in the form of a grant proposal to study a current problem in neuropharmacology.]

BIONB 394 Circadian Rhythms (also BIOGD 394 and ENTOM 394)
Fall. 2 credits. Prerequisite: ENTOM 212, or BIOGD 281, or BIONB 221 or 222, or permission of instructor. S-U grades optional. Lec, W 7:30–9:10 P.M. Offered alternate years. J. Ewer.
For description, see ENTOM 394.

BIONB 396 Introduction to Sensory Systems (also PSYCH 396 and 696)
Spring. 4 credits. Limited to 25 students. Prerequisites: an introductory course in biology or biopsychology, plus a second course in behavior, biopsychology, cognitive science, neuroscience, or perception. Students are expected to have knowledge of elementary physics, chemistry, and behavior. S-U grades optional. Lecs, M W F 10:10. Offered alternate years. B. P. Halpern.
See PSYCH 396 for description.

BIONB 420/720 Topics in Neurobiology and Behavior
Fall or spring. Variable credit. May be repeated for credit. Primarily for undergraduates. S-U grades optional. TBA. Staff.
Courses on selected topics in neurobiology and behavior; can include lecture and seminar courses. Topics, instructors, and time of organizational meetings are listed in the catalog supplement issued at the beginning of the semester.

[BIONB 421 Effects of Aging on Sensory and Perceptual Systems (also PSYCH 431 and 631)
Fall. 3 or 4 credits. The 4-credit option involves a term paper or creation of a relevant web site. Limited to 25 students. Prerequisites: an introductory course in biology or psychology, plus a second course in perception or neurobiology or cognitive science or biopsychology. T R 10:10–11:25. Not offered 2001–2002. B. P. Halpern.
For description see PSYCH 431.]

BIONB 422 Modeling Behavioral Evolution
Spring. 4 credits. Limited to 25 students. Prerequisites: BIONB 221, 1 year of calculus, 1 course in probability or statistics, and *permission of instructor* (Office: W309 Mudd Hall; phone: 254-4352). This course is open to advanced undergraduates and graduate students. S-U grades optional. Lecs, T R 2:30–4:00; computer lab, 1 class period per week TBA. Offered alternate years. H. K. Reeve.
This is an intensive lecture and computer lab course on modeling strategies and techniques in the study of behavioral evolution. Population-genetic (including quantitative-genetic), static optimization, dynamic programming, and game-theoretic methods are emphasized. These approaches are illustrated by application to problems in optimal foraging, sexual selection, sex ratio evolution, animal communication, and the evolution of cooperation and conflict within animal social groups. Students learn to assess critically recent evolutionary theories of animal behavior, as well as to develop their own testable models for biological systems of interest or to extend pre-existing models in novel directions. The *Mathematica* software program is used as a modeling tool in the accompanying computer lab (no prior experience with computers required).

BIONB 424 Neuroethology (also PSYCH 424)
Spring. 4 credits. Prerequisites: BIONB 221 or 222, or 1 year of introductory biology for majors and permission of instructor. S-U grades optional. M W F 11:15; disc, 1 hour each week TBA. C. D. Hopkins.
Neuroethologists take a comparative and evolutionary approach to study the nervous system. They ask, how do brains of animals compare and how did they come about through the process of evolution? How are neural circuits adapted to species-typical behavior? What is the hope and interest in the study of a large diversity of animals, compared to a specialized look at just a few mammalian species? Can we hope to understand how animals with specialized behaviors have specialized nervous systems? What is the sensory world of a real animal and how does it vary from species to species? These and other questions will derive this introductory survey of neuroethology including: exotic senses; amazing motor programs; surprising integration.

[BIONB 425 Molecular Neurophysiology
Spring. 3 credits. Prerequisite: BIONB 222 or permission of instructor. S-U grades optional. Lecs, T R 2:55–4:10. Offered alternate years. Not offered 2001–2002. D. McCobb.
Course focuses on ion channels, the primary proteins generating cellular electrical signals function in nerve cells and other excitable cells (e.g., muscle, heart, glands). The latest electrophysiological and molecular genetic experiments will be reviewed. Diversity of electrophysiology deriving from channel structure and expression patterns will be considered in the contexts of behavior and behavioral plasticity (learning), neural development, and channel evolution. Course format includes written and oral presentations, reviewing scientific literature in selected areas, and proposing new experiments.]

BIONB 426 Animal Communication
Spring. 4 credits. Prerequisites: BIONB 221. Letter grade only. T R 2:55–4:10; disc, 1 hour each week TBA. J. Bradbury, S. Vehrencamp.
An integrated approach to animal communication, organized into three parts: 1) the physics and physiology of producing, transmitting, and receiving signals; 2) optimal strategies for encoding information, using information to make decisions, and designing signals; and 3) the behavioral ecology of signal evolution.

BIONB 427 Animal Social Behavior
Spring. 4 credits. Limited to 30 students. Prerequisites: BIONB 221 and BIOEE 261 or 278, and advance permission of instructor. S-U grades optional, with permission of instructor. Lecs and discs, T R 2:30–4:25. Offered alternate years. T. D. Seeley.
An intensive course for upper-division students interested in behavorial ecology and sociobiology. Lectures, discussions, and student presentations examine topics including adaptation, communication, mating systems, sexual selection, sex ratios, inbreeding and outbreeding, altruism, kin recognition, and conflict and cooperation in animal societies.

[BIONB 428 Topics in Behavior
Fall or spring. 2–4 credits. (Credits based on number of lectures and/or field exercises as outlined in the division's catalog course supplement and subject to approval through the associate director's office.) May be repeated for credit. Primarily for undergraduates. S-U grades optional. Not offered 2001–2002. Staff.
Courses on selected topics in behavior; can include lecture and seminar courses; may include laboratory. Past topics have included animal orientation, insect behavior, biorhythms, and communication. Topics, instructors, and time of organizational meeting are listed in the division's catalog supplement issued at the beginning of each semester.]

[BIONB 429 Olfaction and Taste: Structure and Function (also PSYCH 429)
Spring. 3 or 4 credits (4 credits with term paper or research project, which can, but need not, study nonhuman vertebrates). Preference given to junior and senior psychology and biology majors and graduate students. Graduate students, see PSYCH 629. Prerequisite: a 300-level course in biopsychology or equivalent. Lecs, T R 9:05. Offered alternate years. Not offered 2001–2002. B. P. Halpern.
See PSYCH 429 for description.]

[BIONB 430 Experimental Molecular Neurobiology (also BIOBM 443)
Spring. 2 credits variable. Limited to 12 students. Prerequisites: co-meeting with BIOBM 430 lab. Mandatory registration via

web page: www.mbg.cornell.edu/courses.html. Letter grade only. Disc, 1 hour each week on day other than lab day; Lab T or R all day, or M and W afternoons, to be coordinated with other BIOBM 430 sections. Offered alternate years. Not offered 2001–2002. D. L. Deitcher.
See BIOBM 443 for description.]

BIONB 440 Electronics in Neurobiology
Fall. 4 credits. Limited to juniors, seniors, and graduate students. Prerequisites: a calculus course. S-U grades optional. Lecs, T R 8:40–9:55. Lab, W 1:25–4:25. Offered alternate years. B. R. Land.
The course will emphasize understanding of the electrical functioning of the nervous system and will enable students to build instrumentation to study the nervous system. It will be taught by mathematical analysis, simulation, and construction of circuit examples drawn from practical neurobiological instrumentation problems and the electronic basis of neurons.

[BIONB 441 Computers in Neurobiology
Fall. 4 credits. Limited to juniors, seniors, and graduate students. Prerequisites: a calculus course. S-U grades optional. Lecs, T R 8:40–9:55. Lab, W 1:25–4:25. Offered alternate years. Not offered 2001–2002. B. R. Land.
This course is an introduction to computer instrumentation techniques and data reduction. It will give a basic understanding of the techniques used for coupling a biological experiment to a computer. It will include techniques to convert raw data to scientific visualization. Some computer modeling examples drawn from practical neurobiological problems will be done.]

BIONB 470 Biophysical Methods (also A&EP 470 and VETPR 470)
Spring. 3 credits. Prerequisites: basic knowledge of and interest in physics and mathematics is expected, but strong efforts are made to give an intuitive understanding of the mathematics and physics involved. Some knowledge of physical chemistry, molecular and cell biology, or neurobiology will be helpful. Depending on individual background, all students will find certain aspects easy and other aspects demanding. Letter grades only. Lecs, T R 8:40–9:55. M. Lindau.
See A&EP 470 for description.

BIONB 491 Principles of Neurophysiology
Spring. 4 credits. Limited to 20 students. Prerequisite: BIONB 222 or written permission of instructor. S-U grades for graduate students with permission of instructor. Lecs, M W 10:10; lab, M or T 12:20–4:25; additional hours TBA. B. R. Johnson.
A laboratory-oriented course designed to teach the theory and techniques of modern cellular neurophysiology. Lecture time is used to introduce laboratory exercises and discuss results, to supplement laboratory topics, and for discussion of primary research papers. Extracellular and intracellular recording and voltage clamp techniques are used to analyze motor neuron and sensory receptor firing properties, and examine the cellular basis for resting and action potentials and synaptic transmission. Invertebrate preparations are used as model systems. Computer acquisition and analysis of laboratory results are emphasized.

[BIONB 492 Sensory Function (also PSYCH 492 and 692)
Spring. 4 credits. Limited to 25 students. Prerequisite: a 300-level course in biopsychology, or BIONB 222, or BIOAP 311, or equivalent. Students are expected to have knowledge of elementary physics, chemistry, and behavior. S-U grades optional. Lecs, M W F 10:10. Offered alternate years. Not offered 2001–2002. H. C. Howland, B. P. Halpern.
See PSYCH 492 for description.]

[BIONB 493 Developmental Neurobiology
Fall. 3 credits. Prerequisite: BIONB 222 or permission of instructor. S-U grades optional, with permission of instructor. Lecs, T R 2:55–4:10. Offered alternate years; not offered 2001–2002. R. Booker.
Lectures covering the development of the nervous system, taking examples from both vertebrates and invertebrates. Emphasis is on cellular and molecular issues, that is, how do nerve cells differentiate both morphologically and biochemically? The role of cues such as hormones and developmental genes in neural development is discussed. Readings are taken from original journal articles.]

[BIONB 494 Comparative Vertebrate Neuroanatomy
Spring. 3 credits. Intended for juniors, seniors, and graduate students. Prerequisite: BIONB 222 or equivalent. S-U grades optional. Lecs, T R 10:10–11:30. Offered alternate years. Not offered 2001–2002. A. H. Bass.
Organization and evolution of neuroanatomical pathways as substrates for species-typical vertebrate behaviors. The course is divided into three major sections: development, general principles of brain organization, and co-evolution of vertebrate brain and behavior.]

[BIONB 495 Molecular and Genetic Approaches to Neuroscience
Fall. 3 credits. Limited to juniors, seniors, and graduate students. Prerequisites: BIONB 222 and BIOBM 330 or 332. Letter grade only. Lecs, T R 2:55–4:10. Offered alternate years. Not offered 2001–2002. D. Deitcher.
Focus of the course is on how different molecular and genetic approaches have led to major advances in neuroscience. Lectures, student presentations, and discussions examine original research articles. Topics include ligand-gated channels, potassium channels, seven membrane spanning receptors, development of the neuromuscular junction, neurotransmitter release, second messengers, and learning and memory.]

BIONB 496 Bioacoustic Signals in Animals and Man
Fall. 3 credits. Limited to 12 junior, senior, and graduate students. Prerequisites: 1 year of introductory biology, PHYS 101–102 or 207–208, and permission of instructor. S-U grades optional. Lecs, M W 9:05; lab TBA. Offered alternate years. C. W. Clark.
Humans and animals live in a world of sound. Mechanisms for sound production and perception are extremely varied. Acoustic signals mediate social interactions, and are used to scan the environment for food and to aid in navigation. For many species acoustic sensing plays a critical role in predator detection and avoidance. This course teaches students about animal acoustic signaling by introducing them to various animal acoustic systems. The course presents the physical properties of sound, physiological mechanisms for sound production and hearing, and the behavioral contexts in which sounds are used. Acoustic techniques are provided in the laboratory where students learn how to record, synthesize, and analyze sounds with the aid of recorders and Mac and/or PC computers running customized software. Labs are designed around the lecture material and provide practical "real-world" exercises designed to stimulate discovery of fundamental principles described in lectures. Class research projects on a selected topic in bioacoustics are required. Engineering students with interests in music, audio analysis, and digital signal processing are encouraged.

BIONB 531 From Signals to Syntax (also COGST 531, LING 531, PSYCH 531, COM S 531)
Spring. 4 credits. Prerequisites: COGST 101. S-U grades optional. M 4:15–6:15 P.M. S. Edelman.
See COGST 531 for description.

[BIONB 623 Chemical Communication (also CHEM 622)
Fall. 3 credits. Primarily for research-oriented students. Limited to 30 students. Prerequisites: 1 year of introductory biology for majors or equivalent, course work in biochemistry, and CHEM 358 or equivalent. S-U grades optional. Lecs, M W 10:10; disc, F 10:10. Offered alternate years. Not offered 2001–2002. T. Eisner, J. Meinwald, W. L. Roelofs, and guest lecturers.
The production, transmission, and reception of chemical signals in communicative interactions of animals, plants, and microorganisms. Studies of insects are emphasized. Specific topics are treated with varying emphasis on chemical, biochemical, ecological, behavioral, and evolutionary principles.]

BIONB 720 Seminar in Advanced Topics in Neurobiology and Behavior
Fall or spring. Variable credit. May be repeated for credit. Primarily for graduate students; written permission of instructor required for undergraduates. S-U grades optional. Sem TBA. Staff and students.
Designed to provide several study groups each semester on specialized topics. A group may meet for whatever period is judged adequate to enable coverage of the selected topics. Ordinarily, topics are selected and circulated during the preceding semester. Discussion of current literature is encouraged. Suggestions for topics should be submitted by faculty or students to the chair of the Department of Neurobiology and Behavior.

BIONB 721 Introductory Graduate Survey in Neurobiology and Behavior
Fall. 2 credits. Required of graduate students majoring in neurobiology and behavior. Concurrent registration in BIONB 221 and 222 not required. S-U grades only. Lecs and discs, TBA. C. D. Hopkins and staff.
Lectures, readings, and discussion introduce first-year graduate students to the research activities of the faculty in the Graduate Field of Neurobiology and Behavior. Class meets weekly for two hours. Students also prepare a research proposal on a potential topic for their thesis research (in the format of an NSF or NIH grant). This proposal will be prepared in consultation with one or more relevant faculty members.

[BIONB 723 Advanced Topics in Animal Behavior
Fall or spring. Variable credit. May be repeated for credit. Primarily for graduate students in behavior. Prerequisite: permission of instructor. S-U grades optional. Sem TBA. Not offered 2001–2002. Staff.
A seminar on a specific topic in animal behavior. The instructor presents lectures during the first few course meetings; the remainder of the course is devoted to student presentations. Topic and instructor are listed in the division's catalog supplement issued at the beginning of the semester.]

[BIONB 724 Field Methods in Animal Behavior
Fall or spring. Variable credit. May be repeated for credit. Primarily for graduate students in behavior. Prerequisite: permission of instructor. S-U grades optional. Sem and fieldwork TBA. Not offered 2001–2002. Staff.
A seminar-field experience course designed for first-year graduate students in animal behavior. Weekly seminars discussing field methodology, data collection, and hypothesis testing are followed by an intensive period (10 days to two weeks) in the field. Specific topics and field sites vary from semester to semester. Topic and instructor are listed in the division's catalog supplement issued at the beginning of the semester.]

[BIONB 725 Behavioral Ecology Workshop
Fall. 2 credits. May be repeated for credit. Primarily for graduate students; written permission of instructor required for undergraduates. S-U grades only. Seminar TBA. Offered alternate years. Not offered 2001–2002. J. W. Bradbury, S. L. Vehrencamp.
A hands-on workshop designed to familiarize graduate students with quantitative techniques as applied to behavioral ecology. Only one technique area will be considered each year. Possible areas include spatial statistics, multivariate statistics, bioacoustical analysis, and event analysis. The material covered in the first weeks will attempt to bring everyone, regardless of background, up to a common starting point. All participants will do weekly homework, prepare an introduction to one sub-area, and create homework problems for that sub-area. The topic for a given semester is listed in the catalog supplement issued at the beginning of the semester.]

[BIONB 790 Advanced Topics in Cellular and Molecular Neurobiology
Fall or spring. Variable credit. May be repeated for credit. Limited to graduate students and advanced undergraduates studying neurobiology and behavior. Prerequisite: BIONB 222. S-U grades optional. Lecs and sem TBA. Not offered 2001–2002. Staff.
A lecture-seminar course on selected topics in cellular and molecular neurobiology. Students read original papers in the scientific literature and lead discussions of these articles. Suggestions for topics may be submitted by faculty or students to the chair of the Section of Neurobiology and Behavior. Topic and instructor are listed in the division's catalog supplement issued at the beginning of the semester.]

[BIONB 792 Advanced Laboratory in Cellular and Molecular Neurobiology
Fall or spring. 2 credits. May be repeated for credit. Primarily for graduate students. Prerequisites: BIOBM 330 or 331 or equivalent, BIONB 491 or equivalent, and written permission of instructor. S-U grades optional. Lab TBA. Not offered 2001–2002. Staff.
A two-week intensive laboratory course designed to provide experience with a specific technique currently used in cellular and molecular neurobiology. The technique under study and instructor in charge vary from semester to semester and are listed in the division's catalog supplement issued at the beginning of the semester.]

[BIONB 793 Advanced Topics in Integrative Neurobiology
Fall or spring. Variable credit. May be repeated for credit. Primarily for graduate students; written permission of instructor required for undergraduates. S-U grades optional. Lecs and discs TBA. Not offered 2001–2002. Staff.
A course designed to provide in-depth knowledge of current research in anatomical and physiological bases of vertebrate and invertebrate behavior. Readings are primarily from specialty books and selected journal articles. Topic and instructor are listed in the division's catalog supplement issued at the beginning of the semester.]

[BIONB 794 Advanced Laboratory Techniques in Integrative Neurobiology
Fall or spring. Variable credit. May be repeated for credit. Prerequisite: permission of instructor based upon a personal interview. Lab TBA. Not offered 2001–2002. Staff.
A laboratory in the integrative, or neuroethological, approach to studies of animal behavior. Designed to provide practical working knowledge of research methods in anatomical, physiological, and behavioral approaches to studies of vertebrate and invertebrate behavior. Laboratory technique to be covered and instructor are listed in the division's catalog supplement issued at the beginning of the semester.]

Related Courses in Other Departments

Animal Behavior (Psychology 535)

Biochemistry and Human Behavior (Psychology 361 and Nutritional Sciences 361)

Brain and Behavior (Psychology 425)

Developmental Biopsychology (Psychology 422)

Evolution and Development (BIOGD 480/780; BIOEE 760; BIO G 400)

Evolution of Human Behavior (Psychology 326)

Human Behavior: A Sociobiological Perspective (Anthropology 476)

Insect Behavior Seminar (Entomology 662)

Neurobiology of Animal Behavior (Biological Sciences [BIOSM] 327)

Primates and Evolution (Anthropology 490)

Primate Behavior and Ecology (Anthropology 390)

Teaching Experience (Biological Sciences [BIO G] 498)

The Brain and Sleep (Psychology 440/640)

Undergraduate Research in Biology (Biological Sciences [BIO G] 499)

OTS Undergraduate Semester Abroad Programs

Shoals Marine Laboratory Program

PLANT BIOLOGY (BIOPL)

BIOPL 240 Green World/Blue Planet
Spring. 3 credits. S-U grades optional. Lecs, T R 1:25–2:40. K. J. Niklas, E. R. Turgeon, T. G. Owens.
This course focuses on helping individuals understand how scientific information relates to the issues they face as citizens, in management decision making, and in public policy. To what extent should genetic engineering of crop plants be permitted? Should we place limits on fossil fuel consumption as a means of limiting global warming and global climate change? Must human endeavors be restricted in certain areas to maintain diversity? The format of this course is interactive, with lectures and discussions about how we as a society deal with controversial issues.

BIOPL 241 Introductory Botany
Fall. 3 credits. Lecs, T R 9:05; lab, M T W or R 1:25–4:25, or M W 7:30–10:30 P.M. K. J. Niklas.
Introductory botany for those interested in the plant sciences. Emphasizes structure, reproduction, and classification of angiosperms and the history of life on earth. Laboratory emphasizes development of skills in handling plant materials, including identification. First and second weeks of laboratory are field trips, starting with the first day of classes. *Those who register for an evening laboratory are still required to attend the afternoon field trips.*

BIOPL 242 Plant Function and Growth
Spring. 3 credits. S-U grades optional. Primarily for undergraduates in agricultural sciences, but also for any biological sciences students wanting to know about plant function. Suitable as a second-level course for nonmajors to satisfy the biology distribution requirement. Prerequisites: 1 year of introductory biology and/or BIOPL 241. Recommended: 1 year of introductory chemistry. Concurrent enrollment in BIOPL 244 required of plant science undergraduates and highly recommended for other science majors. May not be taken for credit after BIOPL 342 except by written permission of instructor. Evening prelims Feb. 21 and March 28. Lecs, M W F 10:10. P. J. Davies.
How plants function and grow. Examples deal with crop plants or higher plants where possible, though not exclusively. Topics include cell structure and function; plant metabolism, including photosynthesis; light relations in crops; plant-water relations; water uptake, transport, and transpiration; irrigation of crops; sugar transport; mineral nutrition; growth and development—hormones, responses to light, flowering, fruiting, dormancy, and abscission; stress; tissue culture; and genetic engineering of plants.

[BIOPL 243 Taxonomy of Cultivated Plants (also HORT 243)
Fall. 4 credits. Prerequisite: 1 year of introductory biology or written permission of instructor. May not be taken for credit after BIOPL 248. Lecs, M W F 10:10; labs, M or W 2–4:25. Offered alternate years. Not offered 2001–2002. M. A. Luckow.

A study of ferns and seed plants, their relationships, and their classification into families and genera, emphasizing cultivated plants. Particular emphasis is placed on gaining proficiency in identifying and distinguishing families and in preparing and using analytic keys. Attention is also given to the economic importance of taxa, to the basic taxonomic literature, and to the elements of nomenclature.]

BIOPL 244 Plant Function and Growth, Laboratory
Spring. 2 credits. Prerequisite: concurrent enrollment in BIOPL 242. May not be taken for credit after BIOPL 344. Disc and lab, M T or W 12:20–4:25. T. Silva.
Experiments exemplify concepts covered in BIOPL 242 and offer experience in a variety of biological and biochemical techniques, from the cellular to whole plant level.

BIOPL 245 Plant Biology
Summer (6–week session). 3 credits. Limited to 24 students. Lecs, M-F 11:30–12:45; labs, M W 2–5:00. T. Silva.
Introductory botany, including plant identification. Emphasizes structure, reproduction, and classification of flowering plants. Much of the laboratory work is conducted outdoors taking advantage of several outstanding natural areas which are available for study. Those who lack college-level biology are expected to work closely with the instructor on supplemental instructional materials.

BIOPL 247 Ethnobiology
Fall. 3 credits. S-U grades optional. Lecs, T R 11:15; disc, R 12:20 or 1:25, or F 12:20. D. M. Bates.
A consideration of the principles, methods, and issues of ethnobiology. Emphasis is on the past and present ecological, evolutionary, economic, and cultural interrelationships of humans in traditional and lay societies with their plants and animals, as a means of understanding the place and future of humans in the biosphere. Traditional medicines, underutilized organisms, resource management, and ownership of nature, and methodology are among the topics covered.

BIOPL 248 Taxonomy of Vascular Plants
Spring. 4 credits. Prerequisite: 1 year of introductory biology. May not be taken for credit after BIOPL 243. S-U grades optional. Lecs, M W F 9:05; lab, W or R 1:25–4:25. J. I. Davis.
An introduction to the classification of vascular plants, with attention to the goals of taxonomy, the processes of plant evolution, and the means of analyzing evolutionary relationships among plants. The laboratory concentrates on methods of plant identification and presents an overview of vascular plant diversity, with particular attention to the flowering plants.

[BIOPL 340 Methods in Chemical Prospecting
Spring. 2 credits. Prerequisites: Intro Biology (BIOG 101–104, 105–106, or 107–108) required. Completion or concurrent enrollment in organic chemistry, recommended. TBA. Offered alternate years. Not offered 2001–2002. E. Rodriguez and M. Aregullin.
Student participants will learn theory and methodologies in ethnobotany, chemical ecology and zoopharmacognosy as they apply in a multidisciplinary fashion to chemical prospecting. The use of techniques in the chemistry of natural products and biological assays in the discovery of chemicals and their role in nature will be described. Classical examples of drug development, from quinine to taxol, in the course of chemical prospecting will be discussed. An overall medicinal purpose in chemoprospecting will be emphasized, with mention of specific worldwide spread of diseases pressing for new drugs.]

BIOPL 342 Plant Physiology, Lectures
Spring. 3 credits. Prerequisites: 1 year of introductory biology and either concurrent enrollment in BIOPL 344 or written permission of instructor. May not be taken for credit after BIOPL 242 unless written permission is obtained from instructor. Lecs, T R 10:10–11:25. T. G. Owens.
An integrated and interdisciplinary study of the processes that contribute to the growth, competition, and reproduction of plants. Topics include, but are not limited to, plant water relations, membrane properties and processes, photosynthesis, plant respiration, mineral and organic nutrition, stress physiology, control of growth and development, and responses to the environment. Emphasis is on the relationship between structure and function from the molecular to the whole-plant level.

BIOPL 343 Molecular Biology and Genetic Engineering of Plants
Spring. 2 credits. Prerequisite: 1 year general biology or permission of instructor. S-U grades optional. Lecs, T R 11:15. M. E. Nasrallah.
An introduction to current studies involving recombinant DNA technology and its application to the improvement of plants. The course emphasizes genetic transformation methodology, gene expression systems, and strategies for increasing productivity. The course is directed towards undergraduates who wish to become familiar with the theory and practice of plant biotechnology.

BIOPL 344 Plant Physiology, Laboratory
Spring. 2 credits. Prerequisite: concurrent enrollment in BIOPL 342. May not be taken for credit after BIOPL 244. Similar to BIOPL 244 but at a more advanced level. Lab, R 1:25–4:25; disc, R 12:20. T. Silva.
Experiments exemplify concepts covered in BIOPL 342 and offer experience in a variety of biological and biochemical techniques, from the cellular to whole plant level, with emphasis on experimental design.

[BIOPL 345 Plant Anatomy
Fall. 4 credits. Limited to 15 students. Prerequisite: 1 year of introductory biology or a semester of botany. Lecs, M W 9:05; labs, M W 2–4:25. Offered alternate years. Not offered 2001–2002. Staff.
A descriptive course with equal emphasis on development and mature structure. Lecture, laboratory, and reading are integrated in a study guide. The laboratory offers the opportunity to develop the practical skills required to make anatomical diagnoses and to write anatomical descriptions.]

BIOPL 347 Laboratory in Molecular Biology and Genetic Engineering of Plants
Spring. 2 credits. Limited to 24 students. Prerequisite: BIOPL 343 or permission of instructor. Concurrent enrollment is BIOPL 343 is encouraged. S-U grades optional. Lab, W 12:25–4:25. M. E. Nasrallah.
A companion to BIOPL 343 with laboratory activities that focus on the practice of plant biotechnology. Students will transfer genes to plants by a variety of methods, and will analyze their expression in the host genome by use of reporter gene assays, and by the preparation and analysis of nucleic acids.

BIOPL 348 The Healing Forest
Spring. 2 credits. Prerequisites: introductory biology or plant biology, or permission of instructor. Lec/disc, R 2:30–4:25. Offered alternate years. D. M. Bates, E. Rodriguez.
An ethnobotanical consideration of the role of plants in traditional and western medicine. Studies of indigenous and lay societies illustrate the ecological, systematic, biochemical, and cultural aspects of herbal medicines and are placed in the broader context of such interdependent themes as the conservation of biological and cultural diversity, human health, bioprospecting, compensation for indigenous knowledge, and sustainable development.

BIOPL 404 Crop Evolution, Domestication and Diversity (also PL BR 404)
Spring. 2 credits. S-U letter. Prerequisites: Genetics 281 or Plant Breeding 225 or permission of the instructor. Lecs, T R 9:05. S. Kresovich.
See PL BR 404, for description.

[BIOPL 440 Phylogenetic Systematics
Spring. 4 credits. Limited to 24 students. Prerequisite: introductory biology or permission of instructor. Lecs, T R 10:10; labs, T R 2:00–4:25. Offered alternate years. Not offered 2001–2002. K. C. Nixon.
Basic and advanced theory and methods of phylogenetic analysis. Students are introduced to cladistic analysis using parsimony and gain experience with computer-aided analysis of taxonomic data, including both morphological and molecular data sources. Topics discussed include applications of phylogenetic methods to biogeography and evolutionary studies.]

[BIOPL 441 Systematics and Evolution of Crops
Fall. 2 credits. Prerequisite: an advanced-level course in the plant sciences with taxonomic content or permission of instructor. Lecs, R 12:20–2:15. Offered alternate years. Not offered 2001–2002. Staff.
An integrated study of the systematics and evolution of agronomic and horticultural species. Processes of domestication, the evolutionary history of selected cultigens, the nature of weeds and land races, classification and nomenclature as applied to cultivated plants, and underexploited plant resources are among the topics considered.]

[BIOPL 442 Current Topics in Ethnobiology
Fall. 2 or 4 credits (4 credits with an independent research component and term paper). Prerequisites: BIOPL 247, 348, or permission of instructor. Lec/disc, T 2:30–4:25. Offered alternate years. Not offered 2001–2002. E. Rodriguez, D. M. Bates.
Explorations of the interrelationships of plants and animals with humans from a wide range of perspectives. Topics considered are contemporary issues, theory, and methodology of ethnobotany and ethnobiology, and the role of plants and animals in human lives, in subsistence and exchange, and in thought.]

BIOPL 443 Topics and Research Methods in Systematics
Fall or spring. 1–2 credits (1 credit per section). Prerequisite: written permission of instructor. S-U grades optional. Staff.
A series of one-credit modules on specialized topics in systematics. Topics and instructors vary each semester. May not be taught every semester. Topics and instructors are listed in the division's catalog supplement issued at the beginning of the semester.

BIOPL 444 Plant Cell Biology
Fall. 4 credits. Limited to 24 students. Prerequisites: 1 year of introductory biology or permission of instructor. Lecs, M W F 9:05; lab, M or W 1:25–4:25. R. O. Wayne.
Evidence from microscopy, physiology, biochemistry, and molecular biology is used to try to unravel the mystery of the living cell. The dynamics of protoplasm, membranes, and the various organelles are studied. The mechanisms of cell growth and division, the relationship of the cytoskeleton to cell shape and motility, the interaction of the cell with its environment, and the processes that give rise to multicellular differentiated plants are investigated.

[BIOPL 445 Photosynthesis
Fall. 3 credits. Prerequisites: 1 year of college chemistry and mathematics. Recommended: 1 year of college physics and plant physiology. Lecs, M W F 10:10. Offered alternate years. Not offered 2001–2002. T. G. Owens.
An introduction to the processes of photosynthesis in plants, algae and bacteria. An interdisciplinary approach is emphasized incorporating biochemical, biophysical, physiological and molecular perspectives. The course covers the range of processes involved in photosynthesis beginning with light harvesting and primary photochemistry through electron transport and inorganic carbon fixation. Emphasis is placed on the regulation of photosynthesis from the cellular to the whole-plant level.]

BIOPL 447 Molecular Systematics
Fall. 3 credits. Prerequisites: BIOEE 278 or BIOGD 281 or BIOBM 330, or BIOBM 332, or written permission of instructor. Lecs, T R 8:30–9:55. Offered alternate years. J. J. Doyle.
The theory and practice of using molecular evidence, particularly DNA sequence data, for addressing diverse systematic and evolutionary questions. Emphasis is on phylogeny reconstruction, particularly in eukaryotic systems. The organization and evolution of nuclear and organellar genomes is described from the standpoint of their suitability for systematic and evolutionary studies.

[BIOPL 448 Plant Evolution and the Fossil Record
Spring. 3 credits. Prerequisite: BIOPL 241 or equivalent, or permission of instructor. Lecs, T R 9:05; lab, R 12:20–2:15. Offered alternate years. Not offered 2001–2002. K. J. Niklas, W. L. Crepet.
An introduction to evolution, surveying major changes in plants from the origin of life to the present. Emphasis is placed on plant form and function, adaptations to particular ecologic settings, and evolutionary theory as it relates to plants.]

BIOPL 449 Green Signals and Triggers—The Plant Hormones (also HORT 449)
Fall. 1 credit. S-U grades optional. Prerequisite: 1 year of introductory biology and permission of instructor. F 1:25–2:15. Offered alternate years. P. J. Davies.
A study of plant hormones and how they regulate plant growth and development. Topics covered include the discovery, role in growth and development, mode of action, and practical uses of the plant hormones auxin, gibberellins, cytokinins, abscisic acid, ethylene, and brassinosteroids.

[BIOPL 452 Systematics of Tropical Plants
Spring. 3 credits. Prerequisite: BIOPL 243 or BIOPL 248. Letter grades only. Lec, M W 10:10; lab, T 1:25–4:25. Offered every three years. Not offered 2001–2002. K. C. Nixon.
The families of plants encountered solely or chiefly in tropical regions are considered in a phylogenetic context in lectures, discussions, and laboratory, with the aim of providing basic points of recognition for, and an understanding of, diversity and relationships in these families.]

BIOPL 453 Principles and Practice of Historical Biogeography (also ENTOM 453)
Fall. 3 credits. Prerequisite: a course in systematics or permission of instructors. S-U grades optional. Lecs, T R 10:10; lab T 1:25–4:25. Offered alternate years. J. K. Liebherr and M. A. Luckow.
A survey of techniques in historical biogeography, and the development of modern biogeographic theory in the context of classical, ecological, and phylogenetic analytical methods. Geological and paleontological aspects of biogeography will be presented, and large-scale biogeographic patterns discussed. Laboratories will focus on computer applications and discussion of controversial issues.

[BIOPL 454 Systematics of Tropical Plants: Field Laboratory
Spring break. 1 credit. Limited to 15 students. Prerequisite: concurrent enrollment in BIOPL 452 or permission of instructor. Letter grades only. For more details and application, contact the L. H. Bailey Hortorium, 467 Mann Library. Offered every three years. Not offered 2001–2002. K. C. Nixon.
An intensive orientation to families of tropical flowering plants represented in forests of the American Tropics. Emphasis on field identification combined with laboratory analysis of available materials in a "whole-biology" context.]

BIOPL 456 Biomechanics of Plants (also ABEN 456)
Fall. 3 credits. Prerequisites: upper division undergraduate or graduate status, completion of introductory sequence in biology and one year of calculus, or permission of instructor. S-U or letter grade optional. Lecs, T R 11:15–12:05; disc, W 2:30–3:20. J. R. Cooke and K. J. Niklas.
See ABEN 456, for description.

BIOPL 641 Laboratory in Plant Molecular Biology (also BIOBM 641)
Fall. 4 credits. Prerequisites: BIOGD 281 or equivalent, BIOBM 330 or 331 or equivalent, and permission of instructor. S-U grades with permission of instructor. Lab, T 9:05–4:30. J. B. Nasrallah, M. R. Hanson.
Selected experiments on gene expression, gene transfer, and assay of reporter genes in plants. The course emphasizes the application of molecular biology methodology to plant systems. Additional lab time is required to complete assignments.

[BIOPL 642 Plant Mineral Nutrition (also CSS [SCAS] 642)
Spring. 3 credits. Prerequisite: BIOPL 342 or equivalent. Lecs, M W F 10:10. Offered alternate years. Not offered 2001–2002. L. V. Kochian, R. M. Welch.
A detailed study of the processes by which plants acquire and use mineral nutrients from the soil. Topics include: the uptake, translocation, and compartmentation of mineral elements; root-soil interactions; the metabolism of mineral elements; the involvement of mineral nutrients in various physiological processes; and the nutrition of plants adapted to extreme environmental stresses (e.g., acid soils). Specific mineral elements are emphasized to illustrate these topics.]

BIOPL 644 Regulatory Factors in Plant Growth and Development
Fall. 1–2 credits (1 credit per section). Prerequisites: BIOPL 242 or 342 or equivalent, or permission of instructor. Two modules, which can be taken together or in isolation. These are compatible with BIOPL 652–03 and BIOPL 653–04 (Molecular Aspects of Plant Development II and I respectively). S-U grades optional. Offered alternate years.

Section 01 Plant Hormones
Oct. 5. P. J. Davies.
Plant Hormones: their role in plant growth and development, analysis, biosynthesis and mode of action, including signal transduction, examined from a physiological, biochemical and molecular point of view. The course covers auxin, gibberellin, cytokinin, ethylene, abscisic acid, brassinosteroids, and other compounds as appropriate.

Sec 02 Phytochrome and Photomorphogenesis
1 credit. Lecs M W F 9:05 (12 lecs). Nov. 5-Dec. 7. P. J. Davies.
A study of the regulation of plant growth and development by light as perceived through the pigments phytochrome and cryptochrome. This will include the biochemistry and molecular biology of phytochrome and the way in which phytochrome modulates plant growth, including molecular and genetic analysis of its effects, and the mechanisms by which it acts. The role of phytochrome in detecting and modulating growth in natural and agricultural environments will also be covered.

BIOPL 647 Seminar in Systematic Botany
Fall or spring. 1 credit. May be repeated for credit. Prerequisite: written permission of course coordinator required for undergraduates. S-U grades optional. Sem, T 12:20. Bailey Hortorium staff.
Lectures and discussions led by staff, visitors, and students on topics of current importance to systematic botany.

[BIOPL 648 Plant Biochemistry
Spring. 3 credits. Prerequisites: organic chemistry, biochemistry, and a course in plant physiology. Lecs, M W F 9:05. Offered alternate years. Not offered 2001–2002. T. G. Owens and staff.

Selected areas of plant biochemistry are reviewed in the context of the plant life cycle and responses to the environment. Topics include metabolism of lipids, carbohydrates, organic acids, phenolic compounds; and proteins; nitrogen and sulfur assimilation; respiration; photosynthesis; development and replication of chloroplasts; and cell-wall composition and properties. Attention is paid to operation of control mechanisms.]

BIOPL 649 Physiology of Ion and Water Transport in Plants

Fall. 1–3 credits (1 credit per section). Prerequisite: BIOPL 342 or equivalent, or permission of the instructor. Three modules that may be taken independently, although section 01 is recommended before taking section 02. Offered alternate years. R. M. Spanswick.

Section 01 Basic Principles of Ion Transport and Electrophysiology

1 credit. Lecs T R 10:10–11:30 (9 lecs). Aug. 30-Sept. 27.

The topic of this section is the biophysical basis of ion transport across cell membranes, including membrane structure, ion fluxes and their measurement, the thermodynamic criterion for active transport, and the relationship between ion transport and the electrical properties of cell membranes.

Section 02 Ion Transport in Plants

1 credit. Lecs T R 10:10–11:30 (9 lecs). Oct. 2-Oct. 30.

Topics include: transport of the major ions in plant cells and whole plants; properties of proton ATPases and their relationship to the transport of ions, sugars, and amino acids at the plasma membrane and tonoplast; ion channels in plant cell membranes; intercellular ion transport via plasmodesmata; and long distance ion transport in higher plants.

Section 03 Water Transport in Plants

1 credit. Lecs T R 10:10–11:30 (11 lecs). Nov. 1-Dec. 6.

Topics include: water relations of plant cells and tissues using water potential terminology; permeability of plant cells to water and the role of aquaporins; and transport of water through whole plants, including transpiration, stomatal physiology and the effects of water stress.

[BIOPL 651 Quantitative Whole-Plant Physiology

Fall. 3 credits. Prerequisites: introductory physics, calculus, and plant physiology. S-U grades only. Lecs, T R 10:10–11:30. Offered alternate years. Not offered 2001–2002. R. M. Spanswick.

An exploration of the extent to which physiological processes and their interactions can be formulated in a quantitative manner and integrated to describe various aspects of plant behavior, including growth and yield. Consideration is given to characterization of the plant environment, energy balance, gas exchange, water relations, photosynthesis, respiration, translocation, nutrient supply, and the timing of developmental events.]

BIOPL 652 Plant Molecular Biology II

Spring. 1–2 credits (1 credit per section). Prerequisites: BIOGD 281 and BIOBM 330 or 332, or their equivalents. Recommended: BIOBM 331. S-U grades optional.

A series of four-week modules on specialized topics. Coordinator: J. B. Nasrallah.

Section 01 Molecular Plant-Pathogen Interactions (also PLPA 662)

1 credit. Lecs, M W F 10:10 (12 lecs) Jan. 21–Feb. 15. T. P. Delaney, A. R. Collmer, S. G. Lazarowitz.

An examination of the molecular properties that control the development of host-parasite interactions in both microorganisms (bacteria, viruses, and fungi) and higher plants. Contemporary theories describing the genetic and molecular mechanisms of microbial pathogenesis and plant resistance are discussed.

Section 02 Molecular Plant-Microbe Interactions (BIOMI 652)

1 credit. S-U grades optional. Lecs, M W F 12:20 (12 lecs) Jan. 21–Feb. 15. Offered alternate years. S. C. Winans.

Course focuses on the interactions of *Agrobacteria* and *Rhizobia* with plants. Topics on *Agrobacterium*-plant interactions include plant-microbe recognition mechanisms, T-DNA transfer process, oncogenesis, and use of *Agrobacterium* to produce transgenic plants. Topics on *Rhizobium*-plant interactions include regulation of nitrogenase activity and expression, organization and function of the *sym* plasmid, nodule development, and plant genetics involved in plant-microbe interaction.

[Section 03 Molecular Aspects of Plant Development II

1 credit. S-U grades optional. Lecs, M W F 10:10 (12 lecs) Not offered 2001–2002. Staff.

The molecular genetics of plant development. This module focuses on vegetative development and includes topics such as the development of the shoot, root, and vasculature, and the operation of the vegetative shoot apical meristem. The module is a companion to BIOPL 653, Sec 04 (Plant Development I).]

[Section 04 Plant Gene Evolution and Phylogeny

1 credit. Lecs, M W F 1:25 (12 lecs). Offered alternate years. Not offered 2001–2002. J. J. Doyle.

Practical applications of molecular systematics/evolution for plant molecular biologists and other non-systematists. The course focuses on two basic issues: methods and principles for inferring relationships among genes and the use of data to hypothesize relationships among plants. Evolutionary patterns and processes of genes and gene families are discussed, as well as rates of sequence evolution, paralogy and orthology, the effects of recombination and concerted evolution of gene phylogenies, and the implications of using gene or allele phylogenies to infer organismal evolutionary patterns.]

BIOPL 653 Plant Molecular Biology I

Fall. 1–5 credits (1 credit per section). Prerequisites: BIOGD 281 and BIOBM 330 or 332, or their equivalents. Recommended: BIOBM 331. S-U grades optional. Coordinator: J. B. Nasrallah.

A series of four-week modules on specialized topics.

Section 01 Concepts and Techniques in Plant Molecular Biology (also PLPA 663.01)

1 credit. Lecs, M W F 10:10 (12 lecs) Sept. 3–Sept. 28. T. P. Delaney, G. B. Martin.

This is an introductory module that provides a broad overview of molecular biology concepts relevant to the plant sciences. This section serves as a prerequisite to other modules in the BIOPL 653 (fall) and BIOPL 652 (spring) series. The course is divided into two sections: 1) Gene discovery; this covers genetic, molecular, and genomics approaches to the isolation of plant genes; and 2) Gene characterization; this covers DNA sequencing, gene database analysis, assessment of gene expression, production of transgenic plants, and functional genomics approaches. Emphasis is on understanding the appropriate approach that is needed for different experiments.

Section 02 Plant Biotechnology (also PLBR 653.2 and PLPA 663)

1 credit. Lecs, M W F 1:25 (12 lecs) Oct. 1–Oct. 29. M. Zaitlin, E. D. Earle.

This course deals with production and uses of transgenic plants for agricultural and industrial purposes. Topics include procedures for gene introduction and control of gene expression, as well as strategies for obtaining transgenic plants that are resistant to insects, diseases, and herbicides, produce useful products, or have improved nutritional and food processing characteristics. Regulatory and social issues relating to plant biotechnology are discussed.

[Section 03 Plant Genome Organization (also PLBR 653.3)

1 credit. S-U grades optional. Lecs, M W F 10:10 (12 lecs). Offered alternate years. Not offered 2001–2002. S. D. Tanksley.

This section covers the structure and variation of plant nuclear genomes, including changes in genome size, centromere/telomere structure, DNA packaging, transposable elements, genetic and physical mapping, positional gene cloning, genomic sequencing and comparitive genomics.]

Section 04 Molecular Aspects of Plant Development I

1 credit. Lecs, M W F 10:10 (12 lecs) Oct. 31–Nov. 30. J. B. Nasrallah.

This module focuses on the molecular genetics of plant development. Current approaches to the elucidation of the molecular signals and pathways that lead to the establishment of the differentiated state of floral cells and organs are discussed. Topics include cell-cell signalling in the establishment of pattern and differentiation of specialized cell types, and the control of developmental pathways by endogenous and external cues. The module is a companion to BIOPL 652, Sec 02 (Molecular Aspects of Plant Development II).

Section 05 Molecular Biology of Plant Organelles

1 credit. S-U grades with permission. Lecs, M W F 1:25 (12 lecs) Oct. 31–Nov. 30. M. R. Hanson, D. B. Stern.

An in-depth examination of the molecular biology of plant mitochondria and plastids. Topics include the organization, evolution, and expression of organelle genomes, RNA editing, and the expression of nuclear genes encoding structural or regulatory organelle proteins. Special topics include mitochondrially-encoded cytoplasmic male sterility, transformation and expression of foreign genes in chloroplasts, and the use of genetics to investigate nucleus-organellar interactions.

Section 06 Molecular Breeding and Genetic Diversity (also PLBR 653.6)

1 credit. Lecs M W F 10:10 (12 lecs). Oct. 1–Oct. 29. Offered alternate years. S. D. Tanksley.

Application of DNA markers to the identification, manipulation and isolation of genes important to plant and animal productivity using molecular genetic techniques. Students learn how to design and execute experiments to identify quantitative trait loci (QTLs), as well as how to apply molecular markers to plant and animal breeding programs.

[BIOPL 654 Botanical Nomenclature
Fall. 1 credit. Prerequisite: written permission of instructor. S-U grades only. Lec and disc TBA. Offered alternate years. Not offered 2001–2002. Staff.
An analysis of the International Code of Botanical Nomenclature and its application to various plant groups.]

BIOPL 656 Topics in Plant Evolution
Spring. 1 credit. Prerequisite: BIOPL 448 or equivalent background in evolution, or written permission of instructor. Lab and disc TBA. Offered alternate years. K. J. Niklas.
A series of selected topics to provide a background in plant evolution, paleobotanical literature, and evolutionary theory. Among the topics discussed are the origin of a terrestrial flora, the evolution of the seed plants, and the origin and adaptive radiation of the angiosperms.

BIOPL 740 Plant Biology Seminar
Fall and spring. No credit (no official registration). Required of graduate students doing work in plant biology. Sem, F 11:15. Staff.
Lectures on current research in plant biology, presented by visitors and staff.

BIOPL 741 Problems in Plant Cell and Molecular Biology
Fall. 2 credits. Limited to first- and second-year graduate students in the Plant Cell and Molecular Biology Program. Disc TBA. Staff.
An introduction to the research literature in plant molecular and cellular biology through weekly problem sets and discussions.

BIOPL 742 Current Topics in Plant Molecular Biology
Fall or spring. 1 credit. Enrollment is limited. Primarily for graduate students, with preference given to majors or minors in plant molecular biology; written permission of instructor required for undergraduates. S-U grades only. Sem, 1 hour each week TBA. Staff.

BIOPL 743 Current Research in Plant Cell and Molecular Biology
Fall. 1 credit. Limited to graduate students; written permission from a member of the Plant Cell and Molecular Biology Program or by permission of coordinator required for undergraduates. Disc TBA. Staff.
An introduction for graduate students to the research being conducted by Cornell faculty in the Plant Cell and Molecular Biology Program.

BIOPL 745 Current Topics in Systematics
Fall. 1 credit. Limited to graduate students, except by permission of instructor. S-U grades optional. Disc, T 12:20. Bailey Hortorium staff.
A seminar with presentations and discussion by students of original research papers in systematic biology.

BIOPL 746 Research Seminar in Systematic Botany
Spring. 1 credit. Limited to graduate students, except by permission of instructor. Disc, T 12:20. Bailey Hortorium staff.
A student-led seminar presentation based on his or her thesis research or a related topic.

BIOPL 749 Graduate Research in Botany
Fall or spring. Variable credit. May be repeated for credit. S-U grades optional. Hours TBA. Staff.
Similar to BIO G 499 but intended for graduate students who are working with faculty members on an individual basis.

[BIOPL 840 Current Topics in Plant Physiology
Fall or spring. 2 credits. May be repeated for credit. S-U grades only. Sem TBA. Not offered 2001–2002. Staff.
Molecular aspects of plant hormone biosynthesis, signal transduction and action. Seminar reports by graduate students on current literature in experimental plant physiology or related areas.]

Related Courses in Other Departments

Introductory Mycology (Plant Pathology 309)

Marine Botany: Ecology of Marine Plants (Biological Sciences [BIOSM] 449)

Mycology Conferences (Plant Pathology 649)

Physiological Plant Ecology, Lectures and Laboratory (Biological Sciences [BIOEE] 466 and 468)

Phytomycology (Plant Pathology 709)

Plant Ecology and Population Biology, Lectures and Laboratory (Biological Sciences [BIOEE] 463 and 465)

Plant Ecology Seminar (Biological Sciences [BIOEE] 669)

Plant Cytogenetics Laboratory (Plant Breeding 446)

Teaching Experience (Biological Sciences [BIO G] 498)

Undergraduate Research in Biology (Biological Sciences [BIO G] 499)

COURSES IN MARINE SCIENCE

Cornell offers an extensive listing of undergraduate courses in marine science.

Undergraduates interested in pursuing studies in marine science are encouraged to explore the undergraduate specialization in Marine Biology offered through the Division of Biological Sciences, the undergraduate specialization in Ocean Sciences offered through the Science of Earth Systems Program, and the summer program of courses offered by the Shoals Marine Laboratory. Further information on these programs can be found at the Cornell Marine Programs Office, G14 Stimson Hall, or on their web site, www.sml.cornell.edu.

Undergraduate Specialization in Marine Biology and Oceanography

Biological Sciences majors in the ecology and evolutionary biology program of study have the option of specializing their program of study in the area of marine biology. This specialization is intended for students with interests in understanding the unique aspects of organismal biology in the marine environment. In addition to fulfilling the major and the ecology and evolutionary biology program of study requirements, students in marine biology are encouraged to enroll in the following courses:

1) BIOEE 154, The Sea: An Introduction to Oceanography,
2) BIOSM 364, Field Marine Science, BIOSM 375 Field Marine Biology and Ecology, or a 400-level BIOSM field course at the Shoals Marine Laboratory,
3) BIOEE 462, Marine Ecology.

Undergraduate Specialization in Ocean Sciences

Science of Earth Systems majors have the option of specializing their program of study in the area of ocean sciences. This interdisciplinary specialization is intended for students with interests in understanding the interaction of biological, chemical, geological, and physical processes in ocean systems. In addition to fulfilling the Science of Earth Systems general requirements (see the SES program description in Interdisciplinary Centers, Programs, and Studies section of catalog), students in ocean sciences are required to take four advanced courses from the following list to fulfill their major requirements:

1) BIOEE 373 Biology of the Marine Invertebrates
2) BIOEE 457 Limnology
3) BIOEE 462 Marine Ecology
4) BIOEE 478 Ecosystem Biology
5) BIOES 490 Topics in Marine Biology
6) BIOSM 303 Ecology of Marine Fishes
7) BIOSM 308 Marine Microbial Ecology
8) BIOSM 309 Climates and Ecosystems
9) BIOSM 329 Ecology of Animal Behavior
10) BIOSM 364 Field Marine Science
11) BIOSM 365 Underwater Research
12) BIOSM 374 An Introduction to Field Ornithology
13) BIOSM 375 Field Marine Biology and Ecology
14) BIOSM 413 Experimental Marine Ecology
15) BIOSM 418 Tropical Marine Science
16) BIOSM 449 Seaweeds, Plankton and Seagrass
17) BIOSM 376 Marine Invertebrate Zoology (note: not the same as BIOEE 373)
18) BIOSM 477 Marine Vertebrates
19) EAS 375 Sedimentology and Stratigraphy
20) EAS 455 Geochemistry
21) EAS 475 Special Topics in Oceanography
22) EAS 479 Paleobiology
23) NTRES 306 Coastal and Oceanic Law and Policy
24) NTRES 417 Wetland Resources

Sea Semester

BIOSM 366 SEA: Introduction to Oceanography

BIOSM 367 SEA: Introduction to Maritime Studies

BIOSM 368 SEA: Introduction to Nautical Science

BIOSM 369 SEA: Practical Oceanography I

BIOSM 370 SEA: Practical Oceanography II

These courses must be taken concurrently. Special program run by the Sea Education

Association. Contact Marine Programs Office (607–255–3717) for more details.

Students in both marine science specializations are exposed to an integrated program of study, emphasizing a natural progression of formal course work combined with ample opportunities for practical field experience.

SHOALS MARINE LABORATORY (BIOSM)

G14 Stimson Hall, 255–3717

The objective of the Shoals Marine Laboratory (SML) is to provide undergraduates and other interested adults a unique opportunity to explore marine sciences in an island setting noted for its biota, geology, and history. SML has established a national reputation for excellence and has become North America's largest marine field station focusing on undergraduate education.

The summer population of Appledore Island is limited to about one hundred people at any one time. Participants and faculty members can literally and figuratively immerse themselves in their explorations, free from distractions common to most academic institutions. Because SML is a residential facility, a sense of community develops that makes courses and seminars at SML outstanding educational and intellectual experiences. Participants learn from and exchange ideas with a wide range of specialists whose primary interests are marine but whose perspectives often differ, providing fertile ground for lively discussions.

Credit courses at Shoals Marine Laboratory are full-time, intensive learning experiences. Courses may be taken sequentially, but **not** concurrently. A typical day combines lecture sessions, laboratory and field work, field trips to nearby islands and the mainland, and collecting and research excursions aboard the Laboratory's 47-foot research vessel, *John M. Kingsbury*. Field experience is an integral component of all courses, using Appledore's extensive intertidal and subtidal zones, wading bird rookeries, and seabird colonies. Faculty, drawn from Cornell University, the University of New Hampshire, and other leading academic institutions, are selected not only based on their academic excellence, but also on their teaching ability in the field. In addition, there are numerous guest lecturers including engineers, coastal planners, and specialists from private industry, government, and the academic community.

The Ithaca campus functions of the Shoals Marine Laboratory are centered in the Cornell Marine Programs Office, G14 Stimson Hall. The office serves as an advising center for students interested in the marine sciences, maintains a browsing library with updated information on graduate study and career opportunities as well as on marine programs at other institutions, and administers the SEA Semester, a 17-credit program offered in cooperation with the Sea Education Association (SEA).

The following marine sciences courses are currently administered by the Cornell Marine Programs Office.

BIOSM 160 The Oceanography of the Gulf of Maine
Summer. 4 credits. Limited to 24 students. A special 2-week course offered aboard a SEA vessel and at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details or an application, contact the SML office, G14 Stimson Hall or the Sea Education Association office at P.O. Box 6, Woods Hole, MA, 02543. Daily lecs, labs, and fieldwork for 2 weeks. SML faculty.
An exciting opportunity to explore the offshore and near-coastal environments of the Gulf of Maine for pre-college and first-year non-science majors. Students spend 10 days aboard the Sea Education Association's sailing vessels round trip between Woods Hole, Mass., and the Isles of Shoals via Georges Bank and the Gulf of Maine. Besides operating the ship, students study the many characteristics of this unique ocean environment. Following the sea component, students spend seven days at the Shoals Marine Laboratory collecting data characteristic of the Isles of Shoals coastal environment.

BIOSM 161 Introduction to Field Marine Science
Summer. 4 credits. S-U grades optional. A special 2-week course offered in cooperation with Rider University at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. Apply directly to Rider University, College of Continuing Studies. Contact Dr. Richard Alexander for application and information at: Alexander@enigma.rider.edu, (609) 895–5422. Offered alternate years.
This course allows students who are not biology majors to experience the breadth of the marine sciences under field conditions at an island laboratory. Aspects of biology, geology, earth science, chemistry, and physics are included. Specific topics include: beach, salt marsh, tidal mud flat, tide pool, and benthic offshore environments; identification of marine plants and animals; chemical and physical oceanography; marine geology; and ecology of kelp beds and urchin barrens.

BIOSM 204 Biological Illustration
Summer. 2 credits. A special 1-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily sessions for 1 week. SML faculty.
General discussion of scientific publishing, illustration labeling, color techniques, and printing processes. The course provides the scientist or science student a chance to experience several illustration techniques with the goal of obtaining an overview of scientific and wildlife illustrations. The student may choose a single technique to explore in depth. Course size is limited so that individual attention can be emphasized.

BIOSM 303 Ecology of Marine Fishes
Summer. 4 credits. Prerequisite: 1 year of college-level biology. SCUBA certification recommended, not required. S-U grades optional. A special 2-week course offered at Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs and fieldwork for 2 weeks. SML staff.
This course presents principles, models, and methods for analysis of dynamics of fish populations and communities, and analysis of current research emphasizing theory and its potential uses in fisheries' management. Lab and field activities emphasize collection and analysis of data from the Gulf of Maine and adjacent estuarine habitats.

BIOSM 308 Marine Microbial Ecology
Summer. 4 credits. Prerequisite: 1 year of college-level biology. S-U grades optional. A special 2-week course offered at Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs and fieldwork for 2 weeks. SML staff.
This course examines the fundamental role of marine microbial communities in the function of the biosphere. Lectures survey bacterial, protozoan, and micrometazoan assemblages from Arctic to deep sea vent communities. Laboratory exercises cover several principal techniques of field microbial ecology and explore the rich marine microbial environment surrounding the Isles of Shoals.

BIOSM 309 Climates and Ecosystems
Summer. 4 credits. Prerequisite: 1 year of college-level biology; background preferred in physics/physical geography. S-U grades optional. A special 2-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details or an application consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 2 weeks. SML faculty.
A study of the fundamentals of organism-environment interaction developed through defining and measuring abiotic factors including solar radiation, temperature, atmospheric moisture, precipital wind, and currents. On-site exploration of the dynamics of meteorology and the role of abiotic and biotic factors in the life of coastal and marine plants and animals including humans.

BIOSM 329 Ecology of Animal Behavior (also BIONB 329)
Summer. 4 credits. Prerequisite: 1 year of introductory college biology. Recommended: course work in ecology, psychology, or behavior. S-U grades optional. A special 2-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 2 weeks. SML faculty.
The ecological significance of behaviors of coastal organisms, with emphasis on field and laboratory research methods. Lectures and readings address the major subareas of behavior (communication, orientation, social behavior, foraging, predator avoidance, and sensory mechanisms). Each student engages in short-term behavioral observation and prepares a research proposal for studying a problem within the course subject area.

[BIOSM 363 Marine Biology for Teachers
Summer. 3 or 4 credits (4-credit option: additional 4 days for individual research). Primarily for teachers, grades 6 through 12, but open to others with teaching experience. Prerequisite: 1 year of introductory college biology. S-U grades optional. A special 10-day course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML

office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 10 days. Offered alternate years. Not offered 2001–2002. SML faculty.

Designed to give an overview of living marine organisms (algae, invertebrates, fishes, marine mammals, and shorebirds) and of the environment they inhabit. Fieldwork is emphasized. Occasional lectures and films deal with additional topics such as coastal-zone problems, marine fisheries, economics of marine organisms, and educational resources of the marine environment.]

BIOSM 364 Field Marine Science (FMS)
Summer. 6 credits. Prerequisite: 1 year of college biology. S-U grades optional. A special 4-week course offered twice each summer at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML Office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 4 weeks. 3 core faculty members assisted by up to 15 visiting lecturers, including representatives of governmental agencies. SML faculty.

Designed for the student who desires an initial overview of the marine sciences, this course emphasizes living material in natural habitats. Most of the course work is concerned with the biology of intertidal plants and animals, biological oceanography, ichthyology, and fisheries. Attention is also given to introductory physical and chemical oceanography and marine geology. Marine ecology and the effects of human activity on the marine environment are included. Students apply this knowledge by conducting a transect study toward the end of the course. FMS places emphasis on ichthyology, fisheries biology, general oceanography (biological, physical, and chemical) and marine geology. FMBE (BIOSM 375) places an additional emphasis on ecology, especially in the intertidal zone; ecological, evolutionary and physiological adaptations of marine organisms; and field experiments.

BIOSM 365 Underwater Research
Summer. 4 credits. Prerequisites: 1 year of college-level biology, recognized scuba certification, and a medical examination. S-U grades optional. A special 2-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs and fieldwork for 2 weeks. Team-taught by 3 faculty members with occasional guest lecturers. Not for recreational divers.

Course covers the philosophy of research, hypothesis testing and experimental design, sampling methods, various underwater techniques, diving physics and physiology, and use of dive tables. Emphasis is on subtidal ecological research. Requirements include critical evaluation of several journal articles and production of a research proposal.

BIOSM 374 Field Ornithology (An Introduction)
Summer. 4 credits. Prerequisite: 1 year of college-level biology. S-U grades optional. A special 2-week course offered at Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs and fieldwork for 2 weeks. SML staff.

An introduction to field ornithology focusing on the biology, ecology, and behavior of the avifauna on the Isles of Shoals. The course focuses on field work designed to observe and study many concepts frequently taught in the classroom setting including territoriality, breeding biology, and survivorship. Students learn and apply numerous ornithological field methods including various census techniques, territory mapping, banding, behavioral observations, and creating a field notebook.

BIOSM 375 Field Marine Biology and Ecology (FMBE)
Summer. 6 credits. Prerequisites: 1 full year of college level biology. S-U grades optional. A 4-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML Office, G-14 Stimson Hall. Daily lecs, labs, and fieldwork for 4 weeks. SML faculty.

Designed for students seeking an introduction to the marine sciences and marine ecology; FMBE emphasizes field work in natural habitats. Examines aspects of the biology and ecology of marine organisms, including intertidal plants and invertebrates, fishes, marine mammals and birds, biological oceanography, and human impacts on the marine environment. FMBE places a special emphasis on the ecology of the intertidal zone, and ecological, evolutionary and physiological adaptations of marine organisms. Students may not take FMBE after taking FMS (BIOSM 364).

BIOSM 376 Marine Invertebrate Zoology
Summer. 6 credits. Prerequisite: 1 year of introductory biology and permission of instructors. S-U grades optional. A special 3-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 3 weeks. Offered alternate years. SML faculty.

An introduction to the biology and evolution of the major invertebrate phyla, concentrating on marine representatives. Emphasis is placed on the evolution of form and function, and the ecology, behavior, physiology, chemical ecology, and natural history of invertebrates. Appledore Island's unique location provides an excellent venue for the study of freshly collected and *in situ* representatives of most of the major phyla.

BIOSM 402 Marine Pollution
Summer. 4 credits. Prerequisites: 1 year of college-level biology and chemistry or permission of instructor. S-U grades optional. A special 2-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 2 weeks. Offered alternate years. SML faculty.

An introduction to marine pollutants; their sources and control/treatment; the effects of marine pollution upon coastal ecosystems; and federal and state water pollution regulatory programs. Laboratory includes training in field collection of water samples, measurement and modeling of effluent plume dispersion, and measurement of microbial indicators of water quality, dissolved nutrients, BOD, dissolved oxygen, and toxicity.

BIOSM 413 Experimental Marine Ecology
Summer. 6 credits. Prerequisite: 1 year of college level biology; experience in ecology or physiology recommended. S-U grades optional. A special 3-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 3 weeks. SML faculty.

An introduction to the physiological ecology and functional morphology of marine plants and animals, with emphasis on selected algal and invertebrate examples from the Gulf of Maine. Topics covered include photosynthesis in the marine environment; respiration in intertidal organisms; carbohydrates, proteins, and lipids as nutrients in the sea; acclimation and tolerance of tide-pool biota; and biological responses to competition and grazing. Field and laboratory exercises explore principles and procedures used to characterize the physical, chemical, and biotic environment of intertidal and shallow subtidal organisms, including determination of temperature, light, salinity, oxygen and nutrient levels, and *in vivo* functional analyses of metabolic phenomena. The process of scientific investigation is the predominant theme of the course.

BIOSM 418 Tropical Marine Science
Summer. 8 credits and 4 credits of research. Limited to 12 students. Prerequisites: 1 year college-level biology; recognized SCUBA certification; medical exam; and permission of instructor. A special 8-week course offered in Akumal, Mexico. For more details, contact Shoals Marine Laboratory, G-14 Stimson Hall, 255–3717. For certified divers only. Lec/lab, 2 weeks; 6 weeks monitoring study and individual research projects, including data analysis on computers. SML faculty.

In addition to lectures and laboratories covering the basic principles of coral reef ecology, students participate in a coral reef monitoring survey. Following two weeks of course work, students engage in independent research projects.

BIOSM 449 Seaweeds, Plankton and Seagrass: the Ecology and Systematics of Marine Plants
Summer. 4 credits. Prerequisite: BIOSM 364 or 1 year of introductory biology. S-U grades optional. A special 2-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 2 weeks. SML faculty.

An overview of the major marine algal groups, including aspects of anatomy, morphology, development, life histories, physiology, and use. Laboratories and fieldwork emphasize relationships between distribution and major environmental parameters and involve student projects.

EAS 475 Special Topics in Oceanography: Satellite Remote Sensing in Biological Oceanography
Summer. 6 credits. Prerequisites: 1 course in oceanography and/or marine biology, or permission of the instructor. Strong computer skills are desired. S-U grades optional. A special 4-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H.

and on campus at Cornell University. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 4 weeks. Offered alternative years. SML faculty.

"Remote Sensing" provides hands-on research experience in hydrologic optics and satellite remote sensing to advanced undergraduate and beginning graduate students. The course is comprised of four principal parts, each taught by a separate team of instructors at two different locations: Part 1 (nine days) will be conducted at Shoals Marine Laboratory and aboard the *R/V Kingsbury* in waters surrounding the Isles of Shoals. Part 1 will be devoted to the theory and measurement of seawater optical properties, emphasizing the dependency of apparent optical property on chlorophyll and dissolved organic matter concentrations. Parts 2–4 (19 days) will be conducted at the Science of Earth Systems' computer laboratory on the Cornell campus. Part 2 will cover satellite remote sensing of the apparent optical properties of seawater with an emphasis on processing SeaWiFS data using SeaDAS software and IDL programming language. Part 3 addresses satellite remote sensing of physical oceanographic processes that influence ecosystem dynamics with an emphasis on AVHRR-derived sea-surface temperature and SSM/I-derived ocean winds. Part 4 is devoted to independent projects; student will attempt to integrate SeaWiFS, AVHRR, and SSM/I data in order to address questions of biological-physical interactions.

BIOSM 477 Marine Vertebrates

Summer. 6 credits. Prerequisites: a course in vertebrate biology. S-U grades optional. A special 3-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 3 weeks. SML faculty.

Topics in marine vertebrate biology emphasizing laboratory studies, field collections or observations, and readings from the current literature. Topics covered include: systematics of fishes of the Gulf of Maine; elasmobranch physiology; interpretation of life history and parameters from otolith microstructure; teleost skeletomuscular structure and function; population biology and the contemporary Gulf of Maine fishery; Mesozoic marine reptiles; the biology of sea turtles in cold water; coloniality in sea birds; avian adaptations to life at sea; evolution and systematics of marine mammals; diving physiology; and ecology and conservation of existing marine mammal populations. Dissection of vertebrate animals is a part of one or more laboratory sessions.

BIOSM 490 Topics in Marine Biology

Summer. 1–2 credits. Prerequisite: 1 year of introductory biology and permission of instructors. S-U grades optional. A special course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. and on campus at Cornell University. For more details, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 3 weeks. SML faculty.

Seminar courses on selected topics in marine biology. Students and faculty explore recent research through reading of the primary literature. The course may also include a lab or field trips. Offered in spring semester for two credits with a two-hour discussion per week. Offered at the Shoals Marine Laboratory (summer) for one credit with four one-hour discussions per week for four weeks.

BIOSM 495 Research Methods in Marine Biology

Summer. 1 credit. Prerequisite: concurrent enrollment in BIOSM 499, or permission of instructor. Primarily for undergraduates. A special 8 week course offered at the Shoals Marine Laboratory (SML). For more details or an application, consult the SML office, G14 Stimson Hall. Weekly seminars for 8 weeks. J. G. Morin and M. J. Shulman.

Seminar course on research methodology, experimental design, statistical analyses, and scientific writing. The course is designed to assist students in the research they are conducting while enrolled in BIOSM 499.

BIOSM 499 Research in Biology

Summer. Credits variable (2 credits/7 days on site). For more details and an application, consult the SML Office, G14 Stimson Hall.

Section A: Independent Biological Research: Independent study with a member of the Shoals Marine Laboratory core faculty, based on student faculty interest and available facilities. A short proposal of research must be sent with application materials.

Research Experiences for Undergraduates (REU)

0 credit. The National Science Foundation (NSF) Research Experiences for Undergraduates (REU) program provides support for undergraduates to pursue supervised, independent research projects at the Shoals Marine Laboratory. Nine students will be selected from a competitive, national pool to participate in the eight-week summer program. For more information and an application, please contact the SML office, G14 Stimson Hall, or view SML's web site at: www.sml.cornell.edu

[ARKEO 319 Archaeology Underwater

Summer. 2 credits. Prerequisites: recognized scuba certification and a medical examination required for students engaging in underwater research; also open to non-divers. A special 1-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 1 week. Offered alternate years. Not offered 2001–2002. SML faculty.

An introduction to the subject and a review of this contemporary subdiscipline of archaeology. The approach of the course is practical, with a strong potential for actual on-site experience in search, site recognition, survey, and recording. The course also covers the history and development of the subject, the legal aspects of underwater research, and the worldwide potential of the field. Since any archaeological research project involves a great deal more than digging, the course provides ample opportunities for those who are interested in the subject but are not divers or sufficiently experienced in scuba.]

EAS 213 Marine and Coastal Geology

Summer. 2 credits. Prerequisite: an introductory course in geology or permission of instructor. A special 1-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork for 1 week. SML faculty.

This course examines the complete history of the Isles of Shoals from Paleozoic intrusion, deformation and metamorphism to recent glaciation, sea-level change and wave erosion. Students will learn basic surveying and mapping techniques using the Brunton compass, poplevel/stadia rod, autolevel and GPS. Field efforts will focus on creating a series of thematic maps depicting island characteristics such as topography, bedrock geology and structure, vegetation, and land use patterns.

NTRES 306 Coastal and Oceanic Law and Policy

Summer. 2 credits. A special 1-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs and disc for 1 week. SML faculty.

Intended for people interested in careers in management of marine or coastal resources or in the natural sciences. Subjects include law and policy related to ocean dumping, marine sanctuaries, environmental impact statements, water and air pollution, fisheries management, offshore gas and oil production, and territorial jurisdiction. Lectures on the status and history of law are accompanied by discussion of relevant policy and analysis of the efficacy of various legal techniques. A case study that requires extensive use of the laboratory's library and personnel is assigned. The week concludes with a mock hearing.

NTRES 417 Wetland Resources

Summer. 2 credits. Prerequisite: 1 year of college-level biology. A special 1-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details or an application, consult the SML office, G14 Stimson Hall. Daily lecs, labs, and fieldwork. SML faculty.

An examination of coastal and adjacent freshwater wetlands from historic, destruction, and preservation perspectives, including fresh- and salt-marsh ecology and management. Field trips to selected examples of the wetlands under discussion and follow-up laboratories emphasize successional features, plant identification and classification, and examination of the dominant insect and vertebrate associations.

BIOEE 373 Biology of the Marine Invertebrates

Fall (but taken in the previous summer at the Shoals Marine Laboratory [SML]). 4 credits. Limited to 30 students. Prerequisite: 1 year of introductory biology for majors. Permission of faculty required. 2-week, full-time course. Daily and evening lectures, laboratories, and field work. Offered alternate years.
C. D. Harvell, J. G. Morin, SML faculty.

An introduction to the biology and evolution of the major invertebrate phyla, concentrating on marine representatives. In addition to the evolution of form and function, lectures cover aspects of ecology, behavior, physiology, chemical ecology, and natural history of invertebrates. By being taught at the Shoals Marine Laboratory, students are exposed to a wealth of marine and terrestrial invertebrates

in their natural habitats. Regular field excursions allow an excellent opportunity to study freshly collected and *in situ* representatives of most of the major phyla.

BIOSM 366–372 SEA Semester
In cooperation with the Sea Education Association (SEA), the Shoals Marine Laboratory offers a semester-length sequence of courses designed to provide college undergraduates with a thorough academic, scientific, and practical understanding of the sea. *This sequence is repeated approximately once every two months throughout the year.* Students spend the first half of SEA Semester (a six-week shore component) in Woods Hole, MA, receiving instruction in oceanography, nautical science, and maritime studies. The second half of SEA Semester (a six-week sea component) is spent at sea aboard the R/V *Westward* or the R/V *Corwith Cramer*. Enrollment is open to both men and women judged capable of benefiting from SEA semester; a student must have successfully completed **at least one college-level laboratory science course** (or its equivalent) in order to be admitted to SEA Semester or SEA Summer Session. **No prior sailing experience is necessary**. Cornell students enrolled in the SEA Semester must take the entire sequence.

For more information, contact the Shoals Marine Laboratory office, G14 Stimson Hall, or call SEA directly at 800–552–3633. Program costs are to be paid in place of regular Cornell tuition and fees: tuition for the entire 17-credit SEA Semester, approximately $14,000 which includes room and board at SEA.

Instructors for the SEA Semester include faculty of the Sea Education Association and the Woods Hole Oceanographic Institution and others.

Shore Component (six weeks)

BIOSM 366 SEA Introduction to Oceanography
3 credits. Prerequisite: concurrent enrollment in BIOSM 367 and 368.
A survey of the characteristics and processes of the global ocean. Oceanographic concepts are introduced and developed from their bases in biology, physics, chemistry, and geology. Provides a broad background in oceanography with special attention to areas pertinent to the subsequent cruise. Guest lecturers from the Woods Hole research community interpret current trends and activities in this rapidly evolving field. Students develop individual projects to be carried out at sea.

BIOSM 367 SEA Introduction to Maritime Studies
3 credits. Prerequisite: concurrent enrollment in BIOSM 366 and 368.
An interdisciplinary consideration of our relationship with the marine environment. Covers the elements of maritime history, law, literature, and art necessary to appreciate our marine heritage and to understand the political and economic problems of contemporary maritime affairs.

BIOSM 368 SEA Introduction to Nautical Science
3 credits. Prerequisites: concurrent enrollment in BIOSM 366 and 367.
An introduction to the technologies of operation at sea. The concepts of navigation (piloting, celestial and electronic), naval architecture, ship construction, marine engineering systems, and the physics of sail are taught from their bases in astronomy, mathematics, and physics. Provides the theoretical foundation for the navigation, seamanship, and engineering that students employ at sea.

Sea Component (six weeks)

Courses 369, 370 and 372 take place aboard the R/V *Westward*, a 125-foot steel auxiliary-powered staysail schooner built in 1961, or the R/V *Corwith Cramer*, a 134-foot steel auxiliary-powered brigantine built in 1987 for SEA. Both ships normally put to sea with a ship's company of 34. The professional staff of nine includes the captain, the chief scientist, three science watch officers, three deck watch officers, an engineer, and a steward. In addition, one or more visiting investigators are frequently aboard. Up to 24 students round out the complement.

BIOSM 369 SEA Practical Oceanography I
4 credits. Prerequisite: BIOSM 366.
Theories and problems raised in the shore component are tested in the practice of oceanography at sea. Students are introduced to the tools and techniques of the practicing oceanographer. During lectures and watch standing, students are instructed in the operation of basic oceanographic equipment; in the methodologies involved in the collection, reduction, and analysis of oceanographic data; and in the attendant operations of a sailing oceanographic research vessel.

BIOSM 370 SEA Practical Oceanography II
4 credits. Prerequisites: BIOSM 368 and 369.
Building on the experience of Practical Oceanography I, students assume increasing responsibility for conducting oceanographic research and overseeing operations of the vessel. The individual student is ultimately responsible directly to the chief scientist and the master of the vessel for the safe and orderly conduct of research activities and related operations of the vessel. Each student undertakes an individual research project designed during the shore component.

BIOSM 372 SEA Practical Oceanography III
Summer. 3 credits. Prerequisites: BIOSM 366, 367, and 368.
Theories and problems raised in class are tested in the practice of oceanography at sea. During lectures and watch standing, students are instructed in the operation of basic oceanographic equipment, in the methodologies involved in the collection, analysis, and reduction of oceanographic data, and in the attendant operations of sailing an oceanographic research vessel. Group research projects are completed.

FACULTY ROSTER

New York State College of Agriculture and Life Sciences

Adler, Kraig K., Ph.D., U. of Michigan. Prof., Neurobiology and Behavior
Alani, Eric E., Ph.D., Harvard U. Assoc. Prof., Molecular Biology and Genetics
Anderson, John M., Ph.D., New York U. Prof. Emeritus, Molecular Biology and Genetics
Angert, Esther R., Ph.D., Indiana U. Asst. Prof., Microbiology
Bates, David M., Ph.D., U. of California at Los Angeles. Prof., Plant Biology (Bailey Hortorium)
Beyenbach, Klaus W., Ph.D., Washington State U. Prof., Physiology/Veterinary Physiology†
Bruns, Peter J., Ph.D., U. of Illinois. Prof. Emeritus, Molecular Biology and Genetics
Cade, Thomas J., Ph.D., U. of California at Los Angeles. Prof. Emeritus, Ecology and Evolutionary Biology
Calvo, Joseph M., Ph.D., Washington State U. William T. Keeton Professor in Biological Sciences, Molecular Biology and Genetics
Chabot, Brian F., Ph.D., Duke U. Prof., Ecology and Evolutionary Biology
Clayton, Roderick K., Ph.D., California Inst. of Technology. Prof. Emeritus, Plant Biology
Crepet, William L., Ph.D., Yale U. Prof., Plant Biology (Bailey Hortorium)*
Daniel, Louise J., Ph.D., Cornell U. Prof. Emeritus, Molecular Biology and Genetics
Davies, Peter J., Ph.D., U. of Reading (England). Prof., Plant Biology
Davis, Jerrold I., Ph.D., U. of Washington. Assoc. Prof., Plant Biology (Bailey Hortorium)
Dhondt, André A., Ph.D., Ghent State U. (Belgium). Edwin H. Morgens Professor of Ornithology, Ecology and Evolutionary Biology/Laboratory of Ornithology
Dondero, Norman C., Ph.D., Cornell U. Prof. Emeritus, Microbiology
Doyle, Jeffrey J., Ph.D., Indiana U. Prof., Plant Biology (Bailey Hortorium)
Dress, William J., Ph.D., Cornell U. Prof. Emeritus, Plant Biology (Bailey Hortorium)
Eisner, Thomas, Ph.D., Harvard U. Jacob Gould Schurman Professor, Neurobiology and Behavior*
Emlen, Stephen T., Ph.D., U. of Michigan. Jacob Gould Schurman Professor, Neurobiology and Behavior
Feeny, Paul P., Ph.D., Oxford U. (England). Prof., Ecology and Evolutionary Biology/Entomology
Fitzpatrick, John W., Ph.D., Princeton U. Prof., Ecology and Evolutionary Biology/Laboratory of Ornithology
Flecker, Alexander S., Ph.D., U. of Maryland. Asst. Prof., Ecology and Evolutionary Biology
Fox, Thomas D., Ph.D., Harvard U. Prof., Molecular Biology and Genetics
Fu, Jianhua, Ph.D., U. Pittsburgh. Asst. Prof., Molecular Biology and Genetics
Ghiorse, William C., Ph.D. Rensselaer Polytechnic Inst. Prof., Microbiology
Gibson, Jane, Ph.D., U. of London (England). Prof. Emeritus, Molecular Biology and Genetics
Goldberg, Michael L., Ph.D., Stanford U. Prof., Molecular Biology and Genetics
Hanson, Maureen R., Ph.D., Harvard U. Prof., Molecular Biology and Genetics/Liberty Hyde, Prof., Plant Biology
Harrison, Richard G., Ph.D., Cornell U. Prof., Ecology and Evolutionary Biology
Harris-Warrick, Ronald M., Ph.D., Stanford U. Prof., Neurobiology and Behavior
Harvell, C. Drew, Ph.D., U. of Washington. Prof., Ecology and Evolutionary Biology
Hay, Anthony, Ph.D., U. of California. Asst. Prof., Microbiology
Helmann, John D., Ph.D., U. of California at Berkeley. Assoc. Prof., Microbiology

Henry, Susan, Ph.D., U. of California Berkley. Prof., Molecular Biology and Genetics and Dean CALS
Hopkins, Carl D., Ph.D., Rockefeller U. Prof., Neurobiology and Behavior
Howarth, Robert W., Ph.D., Massachusetts Inst. of Technology/Woods Hole Oceanographic Institution. David R. Atkinson Professor in Ecology and Environmental Biology, Ecology and Evolutionary Biology/Earth and Atmospheric Sciences
Ingram, John W., Ph.D., U. of California at Berkeley. Prof. Emeritus, Plant Biology (Bailey Hortorium)
Jagendorf, André T., Ph.D., Yale U. Liberty Hyde Bailey Professor of Plant Physiology Emeritus, Plant Biology
Kemphues, Kenneth J., Ph.D., Indiana U. Prof., Molecular Biology and Genetics
Kingsbury, John M., Ph.D., Harvard U. Prof. Emeritus, Plant Biology
Kraus, Lee, Ph.D., U. of Illinois. Asst. Prof., Molecular Biology and Genetics
Lis, John T., Ph.D., Brandeis U. Prof., Molecular Biology and Genetics
Loew, Ellis R., Ph.D., U. of California at Los Angeles. Prof., Physiology/Veterinary Physiology†
Lovette, Irby J., Ph.D., U. of Pennsylvania. Asst. Prof., Ecology and Evolutionary Biology/Laboratory of Ornithology
Luckow, Melissa A., Ph.D., U. of Texas at Austin. Assoc. Prof., Plant Biology (Bailey Hortorium)
MacDonald, Russell E., Ph.D., U. of Michigan. Prof. Emeritus, Molecular Biology and Genetics
MacIntyre, Ross J., Ph.D., Johns Hopkins U. Prof., Molecular Biology and Genetics
Madsen, Eugene L., Ph.D., Cornell U. Asst. Prof., Microbiology
Marks, Peter L., Ph.D., Yale U. Prof., Ecology and Evolutionary Biology
McCune, Amy R., Ph.D., Yale U. Assoc. Prof., Ecology and Evolutionary Biology
Morin, James G., Ph.D., Harvard U. Prof., Ecology and Evolutionary Biology
Mortlock, Robert P., Ph.D., U. of Illinois. Prof. Emeritus, Microbiology
Nasrallah, June B., Ph.D., Cornell U. Prof., Plant Biology
Nasrallah, Mikhail E., Ph.D., Cornell U. Prof., Plant Biology
Naylor, Harry B., Ph.D., Cornell U. Prof. Emeritus, Microbiology
Niklas, Karl J., Ph.D., U. of Illinois. Prof., Plant Biology
Nixon, Kevin C., Ph.D., U. of Texas at Austin. Assoc. Prof., Plant Biology (Bailey Hortorium)
Owens, Thomas G., Ph.D., Cornell U. Assoc. Prof., Plant Biology
Paolillo, Dominick J., Jr., Ph.D., U. of California at Davis. Prof. Emeritus, Plant Biology
Parthasarathy, Mandayam V., Ph.D., Cornell U. Prof., Plant Biology†
Quaroni, Andrea, Ph.D., U. of Pavia (Italy). Prof., Physiology/Veterinary Physiology†
Reeve, H. Kern, Ph.D., Cornell U. Assoc. Prof., Neurobiology and Behavior
Roberts, Jeffrey W., Ph.D., Harvard U. Robert J. Appel Professor of Cellular and Molecular Biology, Molecular Biology and Genetics
Rodriguez, Eloy, Ph.D., U. of Texas. Prof., Plant Biology (Bailey Hortorium)
Root, Richard B., Ph.D., U. of California at Berkeley. Prof., Ecology and Evolutionary Biology/Entomology
Rose, Jocelyn, Ph.D., U. of California at Davis. Asst. Prof., Plant Biology
Russell, James B., Ph.D., U. of California at Davis. Prof., Microbiology
Seeley, Jr., Harry W., Ph.D., Cornell U. Prof. Emeritus, Microbiology
Shalloway, David I., Ph.D., Massachusetts Inst. of Technology. Greater Philadelphia Prof., Molecular Biology and Genetics
Shapleigh, James P., Ph.D., U. of Georgia. Asst. Prof., Microbiology
Spanswick, Roger M., Ph.D., U. of Edinburgh (Scotland). Prof., Plant Biology
Thiel, Daniel J., Ph.D., Cornell U. Asst. Prof., Molecular Biology and Genetics
Tye, Bik-Kwoon, Ph.D., Massachusetts Inst. of Technology. Prof., Molecular Biology and Genetics
Uhl, Charles H., Ph.D., Cornell U. Prof. Emeritus, Plant Biology
Uhl, Natalie W., Ph.D., Cornell U. Prof. Emeritus, Plant Biology (Bailey Hortorium)
Van Wijk, Klaas J., Ph.D., Groningen U., The Netherlands. Asst. Prof., Plant Biology
Vogt, Volker M., Ph.D., Harvard U. Prof., Molecular Biology and Genetics
Walcott, Charles, Ph.D., Cornell U. Prof., Neurobiology and Behavior
Wayne, Randy O., Ph.D., U. of Massachusetts. Assoc. Prof., Plant Biology
Winans, Stephen C., Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Microbiology
Winkler, David W., Ph.D., U. of California at Berkeley. Assoc. Prof., Ecology and Evolutionary Biology
Wu, Ray, Ph.D., U. of Pennsylvania. Prof., Molecular Biology and Genetics
Zahler, Stanley A., Ph.D., U. of Chicago. Prof. Emeritus, Molecular Biology and Genetics
Zinder, Stephen H., Ph.D., U. of Wisconsin. Prof., Microbiology

Other Teaching Personnel

Baustian, Mark D., Ph.D., Cornell U. Lecturer, Physiology
Blankenship, James E., M.S., Cornell U. Sr. Lecturer, Molecular Biology and Genetics
Calvo, Rita A., Ph.D., Cornell U. Sr. Lecturer, Molecular Biology and Genetics
Ecklund, P. Richard, Ph.D., Oregon State U. Sr. Lecturer, Neurobiology and Behavior
Ely, Susan, Ph.D., Tufts U. Lecturer, Molecular Biology and Genetics
Glase, Jon C., Ph.D., Cornell U. Sr. Lecturer, Neurobiology and Behavior
Land, Bruce, Ph.D., Cornell U. Sr. Lecturer, Neurobiology and Behavior*
McFadden, Carol H., Ph.D., Cornell U. Sr. Lecturer, Physiology
Merkel, Susan, M.S., Cornell U. Lecturer, Microbiology
Nivison, Helen T., Ph.D., U. of California at Davis. Lecturer, Molecular Biology and Genetics
Rehkugler, Carole M., M.S., Cornell U. Sr. Lecturer, Microbiology
Shulman, Myra J., Ph.D., U. of Washington. Sr. Res. Assoc., Ecology and Evolutionary Biology
Silva, Thomas, Ph.D., Cornell U. Lecturer, Plant Biology

Joint Appointees

Bloom, Stephen E., Assoc. Prof., Poultry and Avian Sciences/Biological Sciences
Bradbury, Jack, Ph.D., Rockefeller. Prof., Neurobiology and Behavior/Library of Natural Sounds
Brutnell, Thomas, Prof., Plant Breeding/Plant Biology
Comstock, Jonathan P., Adjunct Assoc. Prof., Boyce Thompson Institute/Ecology and Evolutionary Biology
Foote, Robert H., Jacob Gould Schurman Prof. Emeritus, Animal Science/Physiology
Giovannoni, James G., Adjunct Asst. Prof., USDA Science and Education Administration/Plant Biology
Hodge, Kathie, Asst. Prof. Plant Pathology/Plant Biology (Bailey Hortorium)
Kochian, Leon V., Adjunct Prof., USDA Science and Education Administration/Plant Biology
Korf, Richard P., Prof. Emeritus, Plant Pathology/Plant Biology (Bailey Hortorium)
Kresovich, Stephen, Prof., Plant Breeding/Plant Biology
Liebherr, James K., Assoc. Prof., Entomology/Plant Biology (Bailey Hortorium)
Mason, Hugh S., Adjunct Asst. Prof., Boyce Thompson Institute/Plant Biology
McClure, Polley A., Prof., Information Technologies/Ecology and Evolutionary Biology
McCouch, Susan R., Assoc. Prof., Plant Breeding/Plant Biology
Richmond, Milo E., Assoc. Prof., USDI Fish and Wildlife Service/Natural Resources/Ecology and Evolutionary Biology
Rossman, Michael J., Adjunct Prof., Purdue U./Molecular Biology and Genetics
Stern, David B., Adjunct Prof., Boyce Thompson Institute/Plant Biology
Tanksley, Stephen, Prof., Plant Breeding/Liberty Hyde Bailey Prof., Plant Biology
Thompson, John F., Adjunct Prof., USDA Science and Education Administration/Plant Biology
Vehrencamp, Sandra, Ph.D., Cornell U. Prof., Neurobiology and Behavior/Library of Natural Sounds
Wheeler, Quentin D., Prof., Entomology/Plant Biology (Bailey Hortorium)

College of Arts and Sciences

Adkins-Regan, Elizabeth, Ph.D., U. of Pennsylvania. Prof., Neurobiology and Behavior/Psychology
Aquadro, Charles F., Ph.D., U. of Georgia. Prof., Molecular Biology and Genetics/Ecology and Evolutionary Biology
Bass, Andrew H., Ph.D., U. of Michigan. Prof., Neurobiology and Behavior
Blackler, Antonie W., Ph.D., U. of London (England). Prof., Molecular Biology and Genetics
Booker, Ronald, Ph.D., Princeton U. Assoc. Prof., Neurobiology and Behavior
Bretscher, Anthony P., Ph.D., Leeds U. (England). Prof., Molecular Biology and Genetics
Brown, William J., Ph.D., U. of Texas Health Science Center at Dallas. Prof., Molecular Biology and Genetics
Capranica, Robert R., Sc.D., Massachusetts Inst. of Technology. Prof. Emeritus, Neurobiology and Behavior
Chen, Rey-Huei, Ph.D., Harvard U. Asst. Prof., Molecular Biology and Genetics
Deitcher, David, Ph.D., Harvard Med. School. Asst. Prof., Neurobiology and Behavior
Ellner, Stephen P., Ph.D., Cornell U. Prof., Ecology and Evolutionary Biology
Feigenson, Gerald W., Ph.D., California Inst. of Technology. Prof., Molecular Biology and Genetics
Finlay, Barbara, Ph.D., Massachusetts Inst. of Tech. Prof., Neurobiology and Behavior/Psychology

Geber, Monica A., Ph.D., U. of Utah. Assoc. Prof., Ecology and Evolutionary Biology
Gibson, Quentin H., Ph.D./D.Sc., Queen's U. (Northern Ireland). Greater Philadelphia Professor Emeritus in Biological Sciences, Molecular Biology and Genetics
Greene, Harry W., Ph.D., U. of Tennessee. Prof., Ecology and Evolutionary Biology
Hairston, Nelson G., Jr., Ph.D., U. of Washington. Frank H. T. Rhodes Professor of Environmental Science, Ecology and Evolutionary Biology
Halpern, Bruce P., Ph.D., Brown U. Prof., Neurobiology and Behavior/Psychology
Hedin, Lars O., Ph.D., Yale U. Assoc. Prof., Ecology and Evolutionary Biology
Heppel, Leon A., Ph.D., U. of California at Berkeley. Prof. Emeritus, Molecular Biology and Genetics
Hess, George P., Ph.D., U. of California at Berkeley. Prof., Molecular Biology and Genetics
Hinkle, Peter C., Ph.D., New York U. Prof., Molecular Biology and Genetics
Howland, Howard C., Ph.D., Cornell U. Prof., Neurobiology and Behavior/Biomedical Sciences
Hoy, Ronald R., Ph.D., Stanford U. Prof., Neurobiology and Behavior
Huffaker, Tim C., Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Molecular Biology and Genetics
Kennedy, Kenneth A. R., Ph.D., U. of California at Berkeley. Prof., Ecology and Evolutionary Biology
Leonard, Samuel L., Ph.D., U. of Wisconsin. Prof. Emeritus, Molecular Biology and Genetics
Linster, Christine, Ph.D., Pierre and Marie Curie U. Asst. Prof., Neurobiology and Behavior
McCobb, David, Ph.D., U. of Iowa. Asst. Prof., Neurobiology and Behavior
MacDonald, June M. Fessenden, Ph.D., Tufts U. Assoc. Prof. Emeritus, Molecular Biology and Genetics/Program on Science, Technology, and Society
McFarland, William N., Ph.D., U. of California at Los Angeles. Prof. Emeritus, Ecology and Evolutionary Biology
Nicholson, Linda, Ph.D., Florida State U. Asst. Prof., Molecular Biology and Genetics
Podleski, Thomas R., Ph.D., Columbia U. Prof. Emeritus, Neurobiology and Behavior
Power, Alison G., Ph.D., U. of Washington. Prof., Ecology and Evolutionary Biology/Science and Technology Studies
Provine, William B., Ph.D., U. of Chicago. Charles A. Alexander Professor of Biological Sciences, Ecology and Evolutionary Biology/History
Seeley, Thomas D., Ph.D., Harvard U. Prof., Neurobiology and Behavior
Sherman, Paul W., Ph.D., U. of Michigan. Prof., Neurobiology and Behavior
Turgeon, Robert, Ph.D., Carleton U. (Canada). Prof., Plant Biology
Wallace, Bruce, Ph.D., Columbia U. Prof. Emeritus, Molecular Biology and Genetics
Whitlock, Kathleen E., Ph.D., U. Washington Seattle. Asst. Prof., Molecular Biology and Genetics
Wilson, David B., Ph.D., Stanford U. Prof., Biochemistry, Molecular Biology and Genetics
Wolfner, Mariana F., Ph.D., Stanford U. Prof., Molecular Biology and Genetics
Zamudio, Kelly R., Ph.D., U. of Washington. Asst. Prof., Ecology and Evolutionary Biology

Other Teaching Personnel

Berry, John, Ph.D., Cornell U. Post Doc, Plant Biology (Bailey Hortorium)
Eberhard, Carolyn, Ph.D., Boston U. Sr. Lecturer, Plant Biology
Johnson, Bruce R., Ph.D., Boston U. Sr. Lecturer, Neurobiology and Behavior

Joint Appointees

Levin, Simon A., Adjunct Prof., Princeton U./ Ecology and Evolutionary Biology‡
Likens, Gene E., Adjunct Prof., Institute of Ecosystem Studies/Ecology and Evolutionary Biology

College of Veterinary Medicine

Gasteiger, Edgar L., Ph.D., U. of Minnesota. Prof. Emeritus, Physiology/Veterinary Physiology
Kotlikoff, Michael I., Ph.D., U. California at Davis. Prof., Veterinary Physiology/ Physiology
Tapper, Daniel N., Ph.D., Cornell U. Prof. Emeritus, Physiology/Veterinary Physiology
Wasserman, Robert H., Ph.D., Cornell U. James Law Prof. Emeritus, Physiology/ Veterinary Physiology/Nutritional Sciences*‡

Other Teaching Personnel

Concannon, Patrick W., Ph.D., Cornell U. Sr. Res. Assoc. Emeritus, Veterinary Physiology/Physiology

Joint Appointees

Fortune, Joanne E., Ph.D., Cornell U. Prof., Veterinary Physiology/Physiology
Gilmour, Robert F., Ph.D., SUNY Upstate Medical Center. Assoc. Prof., Veterinary Physiology/Physiology
Houpt, Katherine A., Prof., Veterinary Physiology/Physiology
Houpt, T. Richard, Prof., Veterinary Physiology/Physiology
Nathanielsz, Peter W., James Law Prof., Veterinary Physiology/Physiology
Robertshaw, David, Ph.D., Glasgow U. (Scotland). Prof., Veterinary Physiology/ Physiology
Wootton, John F., Prof., Veterinary Physiology/Physiology

College of Engineering

Joint Appointees

Cisne, John L., Assoc. Prof., Geological Sciences/Biological Sciences
Webb, Watt W., Prof., Applied and Engineering Physics/Biological Sciences

Biological Sciences

Joint Appointees

Snedeker, Suzanne M., Asst. Prof., Center for the Environment/Biological Sciences

Division of Nutritional Sciences

Joint Appointees

Arion, William J., Prof., Nutritional Sciences/ Molecular Biology and Genetics
Bensadoun, Andre, Prof., Nutritional Sciences/ Physiology
Kazarinoff, Michael N., Assoc. Prof., Nutritional Sciences/Molecular Biology and Genetics
Wright, Lemuel D., Ph.D., Oregon State Coll. Prof. Emeritus, Nutritional Sciences/ Molecular Biology and Genetics

*Joint appointment with the College of Arts and Sciences.

†Joint appointment with the College of Veterinary Medicine.

‡Joint appointment with the College of Agriculture and Life Sciences.

§Joint appointment with the College of Engineering.

COLLEGE OF ENGINEERING

ADMINISTRATION

Harold G. Craighead, interim dean

Michael S. Isaacson, associate dean for research and graduate studies and professional education

Michael Kelley, associate dean for professional development

Deborah Cox, assistant dean for student services

Cathy Long, assistant dean for administration

Marsha Pickens, assistant dean for alumni affairs and development

Richard Cleary, associate dean for undergraduate programs (term ending June 2001)

FACILITIES AND SPECIAL PROGRAMS

Most of the academic units of the College of Engineering are on the Joseph N. Pew, Jr. Engineering Quadrangle. Facilities for applied and engineering physics are located in Clark Hall on the College of Arts and Sciences campus, and facilities for agricultural and biological engineering are centered in Riley-Robb Hall on the campus of the New York State College of Agriculture and Life Sciences.

Special university and college facilities augment the laboratories operated by the various engineering schools and departments, and special centers and programs contribute to opportunities for study and research.

Cornell programs and centers of special interest in engineering include the following:

Center for Applied Mathematics. A cross-disciplinary center that administers a graduate program.

Center for Manufacturing Enterprise. A joint venture of Cornell, industrial organizations, and the federal government to encourage the development and implementation of modern manufacturing systems.

Center for Radiophysics and Space Research. An interdisciplinary unit that facilitates research in astronomy and the space sciences.

Center for Theory and Simulation in Science and Engineering. A supercomputer facility used for advanced research in engineering and the physical and biological sciences.

Cornell Electronic Packaging Alliance. A cooperative venture involving Cornell and several corporations in the areas of computing and microelectronics, organized to undertake precompetitive, interdisciplinary research in electronic packaging.

Cornell High Energy Synchrotron Source (CHESS). A high-energy synchrotron radiation laboratory operated in conjunction with the university's high-energy storage ring. Current research programs at CHESS are in areas of structural biology, chemistry, materials science, and physics.

Cornell Nanofabrication Facility (part of the National Science Foundation funded National Nanofabrication Users Network). A center that provides equipment and services for research in the science, engineering, and technology of nanometer scale structures for electronic, chemical, physical, and biological applications.

Cornell Waste Management Institute. A research, teaching, and extension program within the Center for Environmental Research that addresses the environmental, technical, and economic issues associated with solid waste; one facility sponsored by the institute is the Combustion Simulation Laboratory in the Sibley School of Mechanical and Aerospace Engineering.

Institute for the Study of the Continents. An interdisciplinary organization that promotes research on the structure, composition, and evolution of the continents.

Laboratory of Plasma Studies. A center for interdisciplinary research in plasma physics and lasers.

Cornell Center for Materials Research. An interdisciplinary facility with substantial support from the National Science Foundation, providing sophisticated scientific measurement and characterization equipment.

National Astronomy and Ionosphere Center. The world's largest radio-radar telescope facility, operated by Cornell in Areciebo, Puerto Rico.

National Earthquake Engineering Research Center. A facility recently established by the National Science Foundation and a group of universities in New York State to study response and design of structures in earthquake environments.

National Institutes of Health/National Science Foundation Developmental Resource in Biophysical Imaging and Optoelectronics. A resource that develops novel measurement and optical instrumentation for solving biophysical problems.

Power Systems Engineering Research Center. A research and instructional program centered in a laboratory that has a complete real-time model of an electric power system.

Program of Computer Graphics. An interdisciplinary research center that operates one of the most advanced computer-graphics laboratories in the United States.

Program on Science, Technology, and Society. A cross-disciplinary unit that sponsors courses and promotes research on the interaction of science, technology, and society.

SRC Program on Microscience and Technology. A center sponsored by the Semiconductor Research Corporation to promote research essential to the development of VLSI devices and circuits.

Ward Laboratory of Nuclear Engineering. Irradiation, isotope production, and activation analysis facilities for interdisciplinary research.

The programs listed on this page are sponsored by College of Engineering units and several are industry affiliated. These are in the areas of injection molding, computer science, materials science, geologic study of the continents, and nanometer scale structures.

DEGREE PROGRAMS

Cornell programs in engineering and applied science lead to the degrees of Bachelor of Science, Master of Engineering (with field designation), Master of Science, and Doctor of Philosophy.

General academic information concerning the Bachelor of Science degree is given here under the heading "Undergraduate Study." Curricula for major studies are described under the various academic areas.

Programs leading to the Master of Science and Doctor of Philosophy degrees are administered by the Graduate School. They are described in the *Announcement of the Graduate School* and the special announcement *Graduate Study in Engineering and Applied Science.* The professional Master of Engineering programs and cooperative programs with the Johnson Graduate School of Management are described below.

UNDERGRADUATE STUDY

Bachelor of Science (B.S.) degrees are offered in the following areas:*

Agricultural and Biological Engineering†

Chemical Engineering

Civil Engineering

College Program

Computer Science

Electrical and Computer Engineering

Engineering Physics

Earth and Atmospheric Sciences

Materials Science and Engineering

Mechanical Engineering

Operations Research and Engineering

Students in the College of Engineering begin their undergraduate studies in the Common Curriculum, which is administered by the faculty members of the College Curriculum Governing Board (CCGB) through the associate dean for undergraduate programs and the Engineering Advising office. Subsequently most students enter *field* programs, which are described separately for each academic area. Criteria for entrance into the field programs are described in the section titled "Affiliation with a Field Program." Alternatively students may enter the *College Program* (described below), which permits them to pursue a course of study adapted to individual interests.

Students interested in bioengineering may arrange a suitable curriculum through the bioengineering option, the bioengineering minor, the biomedical minor or the College Program. Students interested in supplementing their field program with formal study in another traditional area of engineering may wish to consider one of the engineering minors offered by the college. Information about both the bioengineering option and engineering minors is available in the Engineering Advising Office, 167 Olin Hall. Students interested in environmental engineering and science may pursue the environmental option offered by the School of Civil and Environmental Engineering and the Department of Agricultural and Biological Engineering, or the science of earth systems (SES) option offered by the Department of Geological Sciences.

*Agricultural and biological engineering, chemical engineering, civil engineering, electrical engineering, engineering physics, materials science and engineering, mechanical engineering, and operations research and engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

†To major in agricultural and biological engineering students normally enroll in the College of Agriculture and Life Sciences for the first three years, and jointly in that college and the College of Engineering for the final year. Students initially enrolled in the College of Engineering, however, may affiliate with the field of agricultural and biological engineering and complete the degree solely within that college.

Requirements for Graduation

To receive the Bachelor of Science degree, students must meet the requirements of the Common Curriculum, as set forth by the College of Engineering, including the requirements of the field program, as established by the school or department with which they become affiliated. Students must meet the Common Curriculum as explained below. (Further explanation of the revised Common Curriculum and field flow charts are provided in the 2001–2002 edition of *The Engineering Undergraduate Handbook.*)

Course Category	*Credits*
1) Mathematics	16
2) Physics (depending on field)	8–12
3) Chemistry (depending on field)	4–8
4) First-Year writing seminar*	6
5) Computing†	4
6) Engineering distribution (3 courses)	
a. One Introduction to Engineering (ENGRI)	3
b. Two other engineering distribution courses (ENGRD)	6
7) Liberal studies distribution (6 courses min.)	18 (min.)
8) Approved electives	6
9) Field program	
a. Field required courses	30 cr. min.
b. Field approved electives	9
c. Courses outside the field	9

*One writing-intensive technical course or a course in technical or scientific writing must also be taken; this course may simultaneously satisfy some other requirement.

†One approved course in computing applications must also be taken; this course may simultaneously satisfy some other requirement, such as an engineering distribution course, an approved elective, or a field program course.

From 123 to 133 credits are required for graduation; the specific number of required credits vary depending on which field program is chosen (see field curricula for specific field requirements). Two terms of physical education must be taken in the freshman year and students must demonstrate proficiency in swimming to satisfy a university requirement.

Mathematics

The normal program in mathematics includes MATH 191 (or 190), 192, 293, and 294. Every student must attain a grade of at least C- in MATH 191 (or 190), 192, 293, and 294, or other courses that may be approved as substitutes for these courses. If this requirement is not met the first time a course is taken, the course must be repeated immediately and a satisfactory grade attained before the next course in the sequence may be taken. Failure to achieve at least a C- the second time around will generally result in withdrawal from the engineering program. Courses that are taken a second time in order to meet this requirement do not yield additional credit toward a degree.

Physics

The normal program in physics includes PHYS 112, 213, and 214 or the corresponding honors courses (PHYS 116, 217, and 218). Engineering students are required to have attained a minimum grade of C- in MATH 191 or equivalent before taking PHYS 112. The same minimum grade is required in each subsequent mathematics course before taking the physics course for which it is a prerequisite (e.g., C- in MATH 192 before taking PHYS 213, or C- in MATH 293 before taking PHYS 214). Students in the field programs of ABEN, CHEME, CEE, COM S, EAS (geoscience and SES options), or OR&E may substitute CHEM 208 for PHYS 214.

Chemistry

CHEM 211 or 207 is required for all students.

CHEM 211 is a course designed for students who do not intend any further study in chemistry. Typically, CHEM 211 is taken during the freshman year, but students who wish to complete the physics program (PHYS 112, 213, and 214) first may postpone CHEM 211 until the sophomore year.

In general, students intending to affiliate with the following departments and schools usually take CHEM 211: Applied and Engineering Physics, Civil Engineering (not students in the environmental engineering option), Computer Science, Electrical and Computer Engineering, Materials Science and Engineering, Mechanical and Aerospace Engineering, and Operations Research and Industrial Engineering. Students considering Chemical Engineering must take CHEM 207 in the fall of their freshman year, to be followed by CHEM 208 in the spring term. All students considering the environmental option in Civil Engineering, Agricultural and Biological Engineering, the science of earth systems option in Earth and Atmospheric Sciences, or a health-related career such as medicine, should take the CHEM 207–208 sequence.

First-Year Writing Seminars

Each semester of their freshman year, students choose a First-Year Writing Seminar from among more than one hundred courses offered by over thirty different departments in the humanities, social sciences, and expressive arts. These courses offer the student practice in writing English prose. They also assure beginning students the benefits of a small class.

Technical Writing

The ability to communicate is essential to successful professional practice. In addition to taking two First-Year Writing Seminars, engineering students must have a significant amount of instruction and practice in technical or scientific writing. They can fulfill this technical-writing requirement by enrolling in an Engineering Communications course (e.g., ENGRC 334 or ENGRC 350), selected courses in the Communications department (COMM 260, 263, or 352), or an approved writing-intensive engineering course, including

- ABEN 489
- ABEN 493 (with coregistration in ABEN 450 or ABEN 473)
- ENGRD/A&EP 264
- CHEME 432
- M&AE 427
- MS&E 403–404
- MS&E 405–406

For information about other options for fulfilling the writing requirement, please consult the Engineering Advising Office, 167 Olin Hall or contact the Engineering Communications Program, 465 Hollister Hall.

Computing

In either the first or second term of their freshman year, students normally take COM S 100, Introduction to Computer Programming. Before graduation they must take an additional course with a significant amount of computing applications; this course may also be used to meet another graduation requirement. Courses that satisfy this requirement are ABEN 453, ABEN 475, ENGRD/COM S 211, ENGRD/COM S 322, ENGRD/CEE 241, ENGRD/A&EP 264, ECE 423, M&AE 470, M&AE 479, M&AE 575, and M&AE 578. The recommended choice for students intending to enter the field program in Engineering Physics is ENGRD 264; in Chemical Engineering, ENGRD 211, 322, or 241; in Civil Engineering, ENGRD 241; in Computer Science, ENGRD 211; in Electrical and Computer Engineering, ENGRD 211; in Mechanical Engineering, M&AE 470, M&AE 479, M&AE 575, or M&AE 578; and in Operations Research and Engineering, ENGRD 211.

Engineering Distribution

Three engineering distribution courses (nine credits) are required. One course must be an Introduction to Engineering Course (designated by ENGRI) to be taken by the student during their freshman year. The Introduction to Engineering course will introduce students

to the engineering process and provide a substantive experience in an open-ended problem solving context. See the Introduction to Engineering Course listing for current course offerings.

The other two distribution courses must be selected from two different categories listed below. A student may use any one of the possible substitutions described.

1) *Scientific computing*
   ENGRD 211, Computers and Programming
   ENGRD 241, Engineering Computation
   ENGRD 322, Introduction to Scientific Computation
2) *Materials science*
   ENGRD 261, Introduction to Mechanical Properties of Materials
3) *Mechanics*
   ENGRD 202, Mechanics of Solids
   ENGRD 203, Dynamics

Students in the field program in Engineering Physics may substitute A&EP 333 for ENGRD 203.

4) *Probability and statistics*
   ENGRD 270, Basic Engineering Probability and Statistics

Students in the field program in Electrical and Computer Engineering may substitute ECE 310 for ENGRD 270. Students in the field program in Engineering Physics may substitute ECE 310 or MATH 471 for ENGRD 270. Students in the field programs in Civil Engineering and Agricultural and Biological Engineering may substitute CEE 304 for ENGRD 270.

5) *Electrical sciences*
   ENGRD 210, Introduction to Circuits for Electrical and Computer Engineers
   ENGRD 231, Introduction to Digital Systems
   ENGRD 264, Computer-Instrumentation Design
6) *Thermodynamics and energy balances*
   ENGRD 219, Mass and Energy Balances
   ENGRD 221, Thermodynamics
7) *Earth and life sciences*
   ENGRD 201, Introduction to the Physics and Chemistry of the Earth
   ENGRD 250, Engineering Applications in Biological Systems
8) *Biology and chemistry*
   A&EP 252/ENGRD 252, The Physics of Life
   BIO G 101 and 103, Biological Sciences, Lecture and Laboratory
   BIO G 105, Introductory Biology
   BIO G 107, General Biology (summer only)
   CHEM 389, Physical Chemistry I

Some fields require a specific engineering distribution course as a prerequisite for the upperclass course sequence. These requirements are:

Agricultural and Biological Engineering: ENGRD 202

Chemical Engineering: ENGRD 219

Civil Engineering: ENGRD 202

Computer Science: ENGRD 211 (co-enrollment in COM S 212 strongly recommended)

Electrical and Computer Engineering: ENGRD 231 (co-enrollment in ECE 232 strongly recommended)

Earth and Atmospheric Sciences: ENGRD 201

Materials Science and Engineering: ENGRD 261

Mechanical Engineering: ENGRD 202

Operations Research and Engineering: ENGRD 270

Liberal Studies Distribution

A minimum of six required liberal studies courses (totaling at least 18 credits) may be chosen from approved courses in four categories: (a) humanities or history, (b) social sciences, (c) foreign languages, and (d) expressive arts. (No First-Year Writing Seminar may be used to meet the liberal studies requirement.)

- At least two courses must be chosen from category (a).
- At least two courses in either category (a), (b), or (d) must be from the same field of study and in the same category. One of these courses must be at or above the 200-level or be an explicit prerequisite of the other.

Following each category is a list of approved courses. Every effort has been made to keep the lists up to date, but errors sometimes occur. Students who wish to use a course that seems to fit the category description but is not listed should contact the Engineering Advising Office.

a) Humanities or History

American Studies 101, 201, 202

Architecture 131, 132, 181, 182, 382

Art 317, 318

Africana Studies 202, 204, 205, 211, 280, 285, 304, 310, 361, 370, 381, 404, 422, 425, 431, 432, 435, 455, 475, 483

Anthropology 290, 451, 452, 453, 455

Archeology (courses in Old World Archeology and 493)

Asian Studies (courses in Asian art, literature, religion, or cultural history)

Biology and Society 205, 206

Classics (all courses except 285, 356, 360, 361, and language courses)

Collective Bargaining, Labor Law, and Labor History 100, 101, 384, 385, 386, 482, 488

Communication 426

Comparative Literature (all courses)

Economics 323, 324, 325, 326, 417

Engineering ENGRG 198, 250, 298, 360

English (all courses except ENGL 285 and writing courses, whose numbers end in the 80s; e.g., 288, 289, 382, etc.)

French Literature (all courses)

German Literature (all courses)

History (all courses)

History of Art (all courses except ART H 200)

Industrial and Labor Relations Interdepartmental Course 451

International and Comparative Labor Relations 430

Italian Literature (all courses)

Jewish Studies 274, 351, 352

Labor Economics 448

Linguistics 109

Music (only introductory, music theory, music history, and digital music courses)

Natural Resources 407

Near Eastern Studies (courses listed under history, civilization, or literature)

Philosophy (all courses except courses in logic and PHIL 383)

Religious Studies 101

Russian Literature (all courses)

Science and Technology Studies 201, 205, 206, 233, 250, 281, 282, 283, 287, 292, 355, 360, 433, 444, 447, 525, 687, 711

Spanish Literature (all courses)

Theater Arts (only courses in Theater Studies, film analysis, and history)

Women's Studies 227, 238, 251, 264, 273, 307, 341, 348, 363, 365, 366, 374, 390, 404, 406, 408, 426, 433, 444, 445, 451, 455, 474, 493

b) Social Sciences

Africana Studies 171, 172, 191, 220, 231, 271, 280, 290, 300, 301, 311, 380, 410, 420, 451, 459, 478, 479

Agricultural Economics (ARME) 100, 250, 430, 431, 432, 450, 451, 464

Anthropology (all courses except 101 and courses in Biological and Ecological Anthropology)

Archeology (all courses except those in Methodology and Technology)

Architecture 342

Asian American Studies 110

Asian Studies (courses in Asian anthropology, economics, government, linguistics, or sociology)

Biology and Society 201, 301, 406, 407

City and Regional Planning 100, 101, 314, 361, 382, 404, 442

Communication 116, 120, 240, 410, 420

Design and Environmental Analysis 150, 250

Economics (all courses except 315, 317, 318, 319, 320, 321, 326. Engineering students should generally take ECON 301–302 and *not* 101–102, unless they have had no calculus.)

Education 210, 212, 271, 311, 317, 322, 360, 413, 477

Government (all courses)

Human Development and Family Studies (all courses)

International and Comparative Labor Relations (all courses)

Labor Economics (all courses except 345 and 448)

Linguistics (all courses)

Natural Resources 350, 400

Organizational Behavior (all courses)

Policy Analysis and Management (all courses except 305, 323, 326, 371, 424, 425, 606, and 607)

Psychology (all courses *except* 223, 307, 322, 324, 326, 332, 350, 361, 396, 422, 425, 426, 429, 465, 470, 471, 472, 473, 475, 476, 478, 479, 480, 491, 492)

Rural Sociology (all courses)

Science and Technology Studies: 311, 350, 360, 390, 391, 401, 407, 411, 427, 453, 483, 490, 645, 664, 700

Sociology (all courses)

Textiles and Apparel 245

Women's Studies 210, 218, 220, 238, 244, 277, 281, 297, 305, 321, 353, 362, 365, 366, 372, 406, 408, 425, 428, 438, 450, 454, 463, 468, 479, 480, 493

c) Foreign Language

This category includes all foreign language courses; if two or more foreign language courses are used to fulfill part of the liberal studies requirement, they must be a sequence of courses in the same language. The rules for placement and advanced placement credit in languages are those of the College of Arts and Sciences. Speakers of languages other than English may obtain up to six advanced placement credits equal to two courses according to these rules.

d) Expressive Arts

Africana Studies 303, 425, 430

Art (studio courses)

Biological Sciences 208, 209

Communications (all courses except 116, 120, 314, 410, 416, 420, 426, 465)

Design and Environmental Analysis 101, 102

Engineering (all Engineering Communications courses, which are designated ENGRC)

English (expository and creative writing courses, whose numbers end in the 80's, e.g., 288, 289, 382, etc.)

Floriculture (courses in Freehand Drawing and Scientific Illustration)

Industrial and Labor Relations 452

Music (courses in musical performance, musical organizations and ensembles; three one-credit courses equals one course)

Science and Technology Studies 352

Theater Arts (all courses except those listed in category (a) above)

Electives

- Approved electives—six credits required (approved by the academic adviser)

Because these courses should help develop and broaden the skills of the engineer, advisers will generally accept the following as approved electives:

1. One Introduction to Engineering course (ENGRI).
2. Engineering distribution courses.
3. Courses stressing written or oral communication.
4. Upper-level engineering courses.
5. Advanced courses in mathematics.
6. Rigorous courses in the biological and physical sciences.
7. Courses in business, economics, or language (when they serve the student's educational and academic objectives).
8. Courses that expand the field program or another part of the curriculum (Note: No ROTC courses may be used as approved electives unless they are co-listed by an academic department.)

- Field approved electives—nine credits (approved by engineering field program faculty and field faculty advisers). Students should refer to the field program curricula for descriptions of courses that meet this category.
- To ensure breadth of engineering studies, field programs will also include nine credits of courses outside the field.

Social Issues of Technology

It is important for engineers to realize the social and ethical implications of their work. Consequently, in selecting their humanities, social sciences, and approved electives, students are urged to consider courses listed in the "Science and Technology Studies" undergraduate area of concentration (see Interdisciplinary Centers and Programs section). These courses may provide students with an important perspective on their studies and their future careers.

Engineering Advising Office

From the time that students enter the college as freshmen until they are affiliated with a major field or the College Program before the second term of the sophomore year, they are under the administration of the Engineering Advising Office, which implements the academic policies of the College Curriculum Governing Board. The office offers general advising and counseling services and serves as the primary resource center for undergraduate students in the college. The Engineering Minority Programs office and the Women's Programs in Engineering office provide additional specialized services.

Freshman Year Requirements

By the end of the freshman year, engineering students are expected to have completed (or received credit for) the following core requirements:

- MATH 191 (or 190) and MATH 192
- Two of the following: CHEM 211, 207, 208, PHYS 112, 213, 214*
- COM S 100
- Two First-Year Writing Seminars
- One Introduction to Engineering course (ENGRI designation)
- Two Physical Education courses

*Students with an interest in pre-med (or other health-related careers), Agricultural and Biological Engineering, Chemical Engineering, the environmental option in Civil Engineering, or the science of earth systems option in Earth and Atmospheric Sciences should enroll in the CHEM 207–208 sequence during their freshman year.

Affiliation with a Field Program

Students must apply for affiliation with a field program during the first term of their sophomore year, although earlier affiliation may be granted at the discretion of the field. This is done by visiting the undergraduate field consultant's office in the field of their choice and completing the Application for Field Affiliation form. To affiliate with a field program, students must (1) have a 2.0 cumulative grade point average and (2) have satisfied the field's course and grade requirements as specified below:

(Please note that fields may impose alternative affiliation requirements for students applying for affiliation later than the first semester of the sophomore year.)

Field Program	*Courses and Minimum Grade Requirements*
Agricultural & Biological Engineering	No more than one grade below C- in mathematics and science courses and ABEN 151 or equivalent
Chemical Engineering	No more than one grade below C- in chemistry, mathematics, physics, or chemical engineering courses and a 2.2 GPA in mathematics, science, and chemical engineering courses
Civil Engineering	A 2.0 GPA in all engineering and science courses and a grade of C- or better in ENGRD 202 (for students in the environmental option who do not take ENGRD 202 prior to affiliation, a grade of C- or better in CHEM 208 is required)
Computer Science	Completion of MATH 293, ENGRD/COM S 211, COM S 212* and COM S 280; a grade of C or better in all COM S courses (excluding COM S 100), with the overall average of these courses being not less than 2.7; a grade of C or better in all MATH classes, with an overall average of these courses being no less than 2.7; an overall GPA of 2.5 or better recommended. (In the event of repeated courses, both grades will be counted in the averages used for affiliation.) *NOTE: COM S 212 required for class of 2004 and later.
Electrical & Computer Engineering	Good academic standing in the College of Engineering Must have completed MATH 293, PHYS 213, and one of ENGRD 210 or ENGRD 231. Must have a minimum grade of C+ and an average of 2.5 in all math, physics and engineering courses The best grade obtained in repeated course will be used to satisfy the minimum grade requirement and all grades (including repeats) will be used to compute the average.
Engineering Physics	A grade of B- or better in all required mathematics and physics courses

Geological Sciences	Good academic standing in the College of Engineering
Materials Science & Engineering	A grade of C- or better in all physics and chemistry courses and a grade of C or better in ENGRD 261.
Mechanical Engineering	A grade of C- or better in mathematics and science courses and ENGRD 202
Operations Research & Engineering	A grade of C- or better in MATH 191 and 192, and a 2.0 GPA in all mathematics, science, and engineering courses (both overall and in the term immediately prior to affiliation)

Students must be affiliated or conditionally affiliated by the end of their fourth semester or they will be withdrawn from the College of Engineering, unless allowed to participate in a terminal semester.

SPECIAL PROGRAMS

Dual Degree Option

A special academic option, intended for superior students, is the dual degree program, in which both a Bachelor of Science and either a Bachelor of Arts or Bachelor of Fine Arts degree can be earned in about five years. Students registered in the College of Engineering, the College of Arts and Sciences, or the College of Architecture, Art, and Planning may apply and, after acceptance of their application, begin the dual degree program in their second or third year. Those interested should contact the appropriate coordinators of dual degree programs at the following locations: 55 Goldwin Smith Hall (for Arts and Sciences) or 135 East Sibley (for Architecture, Art, and Planning); and the Director of Engineering Advising, 167 Olin Hall.

Double Major in Engineering

The Double Major option, which makes it possible to develop expertise in two allied fields of engineering, generally requires at least one semester beyond the usual four years. Students affiliate with one field following normal procedures and then petition to enter a second field before the end of their junior year. All the requirements of both fields must be satisfied. Further information is available from the Engineering Advising Office, 167 Olin Hall, and the individual field consultant offices.

College Program

Individually arranged courses of study under the College Program are possible for those well-qualified students whose educational objectives cannot be met by one of the regular field programs. Often the desired curriculum is in an interdisciplinary area. Each program is developed by the student in consultation with faculty advisers and must be approved by the College Program Committee, which is responsible for supervising the student's work.

Students apply to enter the College Program by the end of the first term of the sophomore year. A student should seek assistance in developing a coherent program from professors in the proposed major and minor subject areas. If approved, the program is the curricular contract to which the student must adhere. Normally, students applying to the College Program should have a 3.0 cumulative grade point average.

Every curriculum in the College Program, with the exception of certain faculty-sponsored programs, must comprise an engineering major and an educationally related minor. The major may be in any subject area offered by schools or departments of the college; the minor may be in a second engineering subject area or in a logically connected nonengineering area. The combinations must clearly form an engineering education in scope and in substance and should include engineering design and synthesis as well as engineering sciences. In addition to 48 credits in the major and minor subjects, including at least 32 credits in engineering courses, each program includes the normally required courses in humanities and social sciences and approved electives.

Further information about the College Program may be obtained from the Director of Engineering Advising, 167 Olin Hall.

Important note: because no single standardized curriculum exists, the College Program is not accredited. College Program students who intend to seek legal licensing as a Professional Engineer should be aware that this nonaccredited degree program will require additional education, work, and/or experience to qualify for eligibility to take the Fundamentals of Engineering examination, and may affect acceptance into engineering graduate programs.

Engineering Minors

The Engineering Minor is a supplement to the regular bachelor's degree programs in the college, including the College Program, and recognizes formal study of a particular technical subject area in engineering normally outside the student's major. Therefore, it may be necessary for some students choosing to complete the requirements for an engineering minor to spend more than the traditional eight semesters to complete their studies at Cornell. In many cases, however, courses fulfilling minor requirements may also satisfy other degree requirements (e.g., distribution courses, approved electives, or field-approved electives). Students undertaking a minor are expected to complete the requirements during the time of their continuous undergraduate enrollment at Cornell.

To complete an engineering minor, an undergraduate engineering student must

- be enrolled in a major field program that approves the participation of its affiliates in the desired minor.
- successfully complete all the requirements for a bachelor of science degree in engineering.
- satisfactorily complete six courses (18 credit minimum) as stipulated in a college-approved minor offered by an engineering school or department other than that which offers the student's major.

Students may apply for certification of an engineering minor at any time after the necessary coursework has been completed in accordance with published standards. Students who receive certification in an approved engineering minor will be recognized by means of an official notation on their Cornell transcript following graduation.

The College of Engineering currently offers minors in the following areas (offering departments are indicated in parentheses):

Applied Mathematics (T&AM)

Biological Engineering (ABEN)

Biomedical Engineering (T&AM)

Civil Infrastructure (CEE)

Computer Science (COM S)

Electrical and Computer Engineering (ECE)

Engineering Management (CEE)

Engineering Statistics (OR&IE)

Environmental Engineering (ABEN/CEE)

Geological Sciences (EAS)

Industrial Systems and Information Technology (OR&IE)

Materials Science and Engineering (MS&E)

Mechanical Engineering (M&AE)

Operations Research and Management Science (OR&IE)

Additional information on specific minors can be found in the departmental sections of this publication, The *Engineering Undergraduate Handbook*, the undergraduate field office of the department offering the minor, and the Engineering Advising Office.

The Bioengineering Option and the Biological Engineering and Biomedical Engineering Minors

Students wishing to apply the concepts and methods of the engineering, computational and physical sciences to living systems or health issues may pursue one of three courses of study:

(1) the bioengineering option, requiring completion of four bioengineering courses (12 credit hours minimum) and one credit hour of Bioengineering Seminar (ENGRG 501). The student will receive official notation on their transcript. Further information is available in the Engineering Advising Office, 167 Olin Hall.

(2) the bioengineering minor, requiring six courses (18 credit hours minimum) including ABEN 350, two analysis courses, two application courses and one basic science course (see p.). This minor provides the student an opportunity to further their understanding of living systems and the basic transport processes that occur in these systems. Further information is available from the ABEN Program Coordinator, 207 Riley-Robb Hall.

(3) the biomedical minor, requiring six courses (18 credit hours minimum) from five different groups—Biomaterials and Biomechanics, Biomedical Systems, Instrumentation, Molecular and Cellular Biology, and Physiology (see p.). Further information is available from the T&AM Field Consultant, 221 Kimball Hall.

International Programs

All students who plan to study abroad apply through Cornell Abroad; please see the Cornell Abroad program description in the introductory section of Courses of Study.

An international perspective, sensitivity to other cultures, and the ability to read and speak a second language are increasingly important to today's engineers. In keeping with the university goals of internationalizing the curriculum, the College of Engineering encourages students to study or work abroad during their undergraduate years. For further information on these and other opportunities to add an international dimension to your undergraduate education, see the staff in the Engineering Advising Office, 167 Olin Hall. Students who seek advice on obtaining an international co-op work experience may visit the Engineering Cooperative Education and Career Services office, 201 Carpenter Hall.

Engineering Communications Program

The Engineering Communications Program (ECP) provides instruction in the written, oral, and visual presentation of technical and scientific information. Engineering Communications, ENGRC 350, and Communications for Engineering Managers, ENGRC 335, are three-credit seminars that give students a thorough introduction to these areas. These courses use material from the engineering and business workplace, and many assignments are based on actual events and professional situations. Students learn to direct their writing and presentations to different audiences that have varying roles and levels of expertise. They learn about effective teamwork and deal with organizational and ethical issues in the communications they encounter and produce. Classes have lively discussion, and the limited size of sections ensures close attention to individual students' work. Occasionally, the program's instructors offer courses or independent studies in topics of special interest. ECP courses fulfill the college's technical writing requirement (see Requirements for Graduation).

In addition to offering communications seminars, the program works with the engineering fields to integrate communications instruction into technical courses. The program presents workshops and lectures on relevant communications topics and helps to develop assignments, instructional materials, and assessment strategies for writing and oral presentations. The goal of these writing-intensive efforts is to strengthen students' understanding of engineering course material and increase their ability to communicate it.

The ECP also gives presentations to student groups on effective writing, oral communication, and teamwork and has been involved in innovative educational projects such as Peer Teaching in Engineering (ENGRG 470), a collaborative learning initiative in physics, mathematics, chemistry, and engineering design. The program awards several annual prizes for outstanding writing, oral presentation, and teamwork. For further information, contact the director, 465 Hollister Hall.

Engineering Cooperative Education Program

A special program for undergraduates in most fields of engineering is the Engineering Cooperative Education Program, which provides an opportunity for students to gain practical experience in industry and other engineering-related enterprises before they graduate. By supplementing course work with carefully monitored, paid jobs, co-op students are able to explore their own interests and acquire a better understanding of engineering as a profession.

To be eligible, a student must have been enrolled at Cornell for four semesters prior to working, with a cumulative GPA of 2.7 or higher. (Students in Computer Science and Agricultural and Biological Engineering are eligible, even though they may not be registered in the College of Engineering.) Applicants are interviewed by representatives of participating employers and select their work assignments from any offers they receive. Those students who are offered assignments and elect to join the program usually take their fifth-term courses at Cornell during the summer following their sophomore year and begin the first co-op work assignment that fall. They return to Cornell to complete term six with their classmates and then undertake a second work assignment with the same company the following summer. Co-op students return to campus for their senior year and graduate with their class.

Further information may be obtained from the Engineering Cooperative Education and Career Services office, 201 Carpenter Hall.

MASTER OF ENGINEERING DEGREE PROGRAMS

One-year Master of Engineering (M.Eng.) programs are offered in 13 fields. These programs are discussed in this announcement in connection with the corresponding upperclass engineering field programs because the curricula are integrated. Cornell baccalaureate engineering graduates frequently continue their studies in the M.Eng. program, although the program is also open to qualified graduates of other schools. More information is available through the Master of Engineering web site: www.engineering.cornell.edu/grad. The M.Eng. degrees and the academic fields under which they are described are listed below.

M.Eng. (Aerospace): Mechanical and Aerospace Engineering

M.Eng. (Agricultural and Biological): Agricultural and Biological Engineering

M.Eng. (Chemical): Chemical Engineering

M.Eng. (Civil & Environmental): Civil and Environmental Engineering

M.Eng. (Computer Science): Computer Science

M.Eng. (Electrical): Electrical and Computer Engineering

M.Eng. (Engineering Physics): Applied and Engineering Physics

M.Eng. (Geology): Earth and Atmospheric Sciences

M.Eng. (Materials): Materials Science and Engineering

M.Eng. (Mechanical): Mechanical and Aerospace Engineering

M.Eng. (Engineering Mechanics): Theoretical and Applied Mechanics

M.Eng. (Nuclear): Nuclear Science and Engineering

M.Eng. (OR&IE): Operations Research and Industrial Engineering

Candidates for a professional master's degree who wish to specialize in areas related to manufacturing may avail themselves of two special programs. The manufacturing systems engineering option may be centered in any one of the fields listed above. This option is attested to by a Dean's Certificate in addition to a diploma at the time of graduation. An industrial internship program provides opportunities to combine on-campus education with off-campus industrial experience.

An M.Eng. option of potential interest to engineers from all fields is the program in Engineering Management, offered by the School of Civil and Environmental Engineering. This option is described in the section related to the M.Eng. (Civil & Environmental) degree.

Cornell engineering graduates in the upper half of their class will generally be admitted to M.Eng. programs; however, requirements for admission vary by field. Superior Cornell students who will have between one and eight credits remaining in their last undergraduate semester may petition their field representative for early admission to the M.Eng. program. Other applicants must have a baccalaureate degree or its equivalent from a college or university of recognized standing, in an area of engineering or science that is judged appropriate for the proposed field of study. They also must present evidence of undergraduate preparation equivalent to that provided by a Cornell undergraduate engineering education, a transcript, two letters of recommendation, and a statement of academic purpose. A candidate who is admitted with an undergraduate background that is judged inadequate must make up any deficiencies in addition to fulfilling the regular course requirements for the degree. Most fields require applicants from other undergraduate institutions to submit the results of the Graduate Record Examination (GRE) aptitude tests. All applicants from foreign universities must submit GRE scores and must have an adequate command of the English language. Financial aid providing partial support is available for very highly qualified candidates, primarily those who are residents of the United States.

Cooperative Programs with the Johnson Graduate School of Management

Students interested in deferring admissions to the Johnson Graduate School of Business Management may be eligible for the Knight Scholarship Award. Upon completion of the M.Eng. degree, Knight Program students spend three to five years in relevant full-time work experience before starting the M.B.A. program. More information about the Knight program or admission to the joint degree programs may be obtained from the Office of Research, Graduate Studies, and Professional Education, 146 Olin Hall.

Outstanding students with relevant work experience may be admitted to one of two joint Master of Engineering and Master of Business Administration degree programs. One, which Cornell students enter during their undergraduate career, makes it possible to earn the B.S., M.Eng., and M.B.A. in six years—one year less than such a program would normally require. The second program, which is available to students who already

hold baccalaureate degrees from Cornell or other institutions, requires five semesters and leads to both the M.Eng. and M.B.A. Students are required to apply for admission to both the College of Engineering and the Johnson Graduate School of Business Management.

ACADEMIC PROCEDURES AND POLICIES

Advanced Placement Credit

The College of Engineering awards a significant amount of advanced placement (AP) credit to entering freshmen who demonstrate proficiency in the subject areas of introductory courses. Students can earn AP credit by receiving qualifying scores on any of the following:

(1) Advanced placement examinations given and scored by the College Entrance Examination Board (CEEB);

(2) General Certificate of Education (GCE) Advanced ("A") Level Examinations;

(3) International Baccalaureate (IB) Higher Level Examinations; or

(4) Cornell's departmental placement examinations, given during orientation week prior to the beginning of fall-term classes.

Advanced placement credit is intended to permit students to develop more challenging and stimulating programs of study. Students who receive AP credit for an introductory course may use it in three different ways.

1) They may enroll in a more advanced course in the same subject right away.

2) They may substitute an elective course from a different area.

3) They may enroll in fewer courses, using the AP credit to fulfill basic requirements.

Acceptable Subjects and Scores for CEEB or Cornell Departmental AP Exams

The most common subjects for which AP credit is awarded in the College of Engineering, and the scores needed on qualifying tests, are listed below. AP credit is awarded only for courses that meet engineering curriculum requirements.

Mathematics: MATH 191 (or 190), 192, 293, and 294 are required.

First-term math (MATH 191). AP credit may be earned by:

- a score of 3, 4, or 5 on the CEEB BC exam, or
- a score of 5 on the CEEB AB exam, or
- a passing score on the Cornell departmental exam for first-term math.

First-year math (through MATH 192). AP credit may be earned by:

- a passing score on the Cornell departmental exam for first-year math.

Physics: PHYS 112 and 213 are required.

PHYS 112. AP credit may be earned by:

- a score of 4 or 5 on the mechanics portion of the CEEB C exam, or
- a score of 5 on the CEEB B exam *only* if the student has at least one semester of AP or transfer credit in first-term mathematics at the time of matriculation, or
- a passing score on the Cornell departmental exam for PHYS 112.

Note: Students who have received credit for PHYS 112 **may not** enroll in PHYS 213 unless concurrently enrolled in MATH 293.

PHYS 213. Students receiving a 5 on the Electricity and Magnetism portion of the C exam may choose to accept AP credit for PHYS 213 or placement in PHYS 217 with no AP credit for PHYS 213. For advice or more information contact the departmental representative at 607 255–6016.

Chemistry: CHEM 207 or CHEM 211 is required.

CHEM 207 or CHEM 211. AP credits may be earned by:

- a score of 5 on the CEEB AP exam, or
- a passing score on the Cornell departmental exam for Chemistry.

Note: students who are successful in obtaining AP credit for CHEM 207 and who are considering majors in Chemical Engineering or Materials Science and Engineering should consider enrolling in CHEM 215. Those who are offered AP credit for CHEM 207 and then elect to take CHEM 215 will also receive academic credit for CHEM 207. You may want to discuss this option with your faculty adviser.

Computing: COM S 100 is required. AP credit may be earned by:

- a score of 4 or 5 on the CEEB A or AB exam, or
- a passing score on the Cornell departmental exam for COM S 100.

Biology: Biology is not required of engineering students, although it is a popular option as an elective, especially for students who intend to pursue health-related careers. AP credit may be earned as follows:

- eight credits will be offered to students who receive a 5 on the CEEB AP exam;
- six credits will be offered to students who receive a 4 on the CEEB AP.

Those who want to study more biology should contact the Office of Undergraduate Biology, 200 Stimson Hall, to discuss proper placement.

First-Year Writing Seminar: Two First-Year Writing Seminars (for a total of six credits) are required.

- AP credit for one First-Year Writing Seminar may be earned by a score of 5 on either of the CEEB AP English exams.

Students who earn a score of 4 on the AP English Literature and Composition exam will be offered three credits which may be applied toward the Humanity/History category of the Liberal Studies distribution requirement. Students who earn a score of 4 on the AP English Language and Composition exam will be offered three credits which may be applied toward the Expressive Arts category of the Liberal Studies distribution requirement.

Liberal Studies Distribution: Six courses beyond two First-Year Writing Seminars are required. Students may earn AP credit toward the liberal studies distribution by taking College Entrance Examination Board (CEEB) AP tests. AP credit earned in the humanities or social sciences cannot be used to fulfill the "upper level" liberal studies requirements.

Modern Languages: Students may earn AP credit for competence in a foreign language by taking the College Entrance Examination Board (CEEB) AP test or by taking the Cornell Advanced Standing Examination (CASE). Those who score 4 or 5 on the CEEB AP test are entitled to three credits. In order to qualify for the CASE exam, the student must score at least 650 on a College Placement Test (taken either in high school or at Cornell during Orientation Week). A score of 2 on the CASE entitles the student to three credits, and a score of 3 entitles the students to six credits which are equivalent to two courses. Modern language AP credits may be used to satisfy the foreign language category of the liberal studies distribution, or may meet an approved elective requirement, contingent on discussions with the faculty adviser.

Advanced Placement and Credit for International Credentials

Students who have successfully completed either a General Certificate of Education (GCE) Advanced ("A") Level Examination or an International Baccalaureate (IB) Higher Level Examination may be eligible for advanced placement credit in the College of Engineering as follows:

General Certificate of Education Advanced Level Examination (GCE "A")

Hong Kong Advanced Level examinations and the joint examination for the Higher School Certificate and Advanced Level Certificate of Education in Malaysia and Singapore—principal passes only—are considered equivalent in standard to GCE "A" Levels.

Subject	Marks	Credit
Biology	A or B	8 credits
Chemistry	A	8 credits (CHEM 207 and 208)
	B	4 credits (CHEM 207)
Mathematics	A or B	8 credits (MATH 191/190 and 192)
	C	4 credits (MATH 191/190)
Physics	A or B	4 credits for PHYS 112; 4 additional credits for PHYS 213 are granted to a combination of grades of A or B and a minimum of 8 Advanced Placement (or advanced standing) credits in mathematics.

International Baccalaureate (IB) Higher Level Examination

Subject	Marks	Credit
Biology	7	8 credits
	6	6 credits
Chemistry	6 or 7	4 credits (CHEM 207 or CHEM 211)

Computer Science	6 or 7	4 credits (COM S 100)
Mathematics	6 or 7	8 credits (engineering students must consult with the math department to determine prerequisite for placement in third-semester math course.)
Physics	6 or 7	4 credits (PHYS 112)

Note: Advanced Placement credit based on GCE or IB results may also be awarded for courses that satisfy the liberal studies requirement in the College of Engineering. In such cases, the College of Engineering follows the AP guidelines found earlier in this publication under "General Information."

General Policies for Advanced Placement

The general policies in the College of Engineering governing awards of AP credit are as follows:

1. AP credit will not be offered in any subject area without a documented examination.
2. All AP examinations are normally taken and scored before fall-term classes begin. Students who take CEEB AP tests in high school should have an official report of their scores sent directly to Cornell as soon as possible. Students who have completed either GCE "A" Level or IB Higher Level Examinations must present the original or a certified copy of their examination certificate to the Engineering Advising Office, 167 Olin Hall. Those who wish to take departmental examinations should do so during Orientation Week; permission to take these tests after the start of fall-term classes must be requested in a written petition to the College's Committee on Academic Standards, Petitions, and Credit (ASPAC).

A more detailed description of the college's policies concerning advanced placement credit and its use in developing undergraduate programs may be found in the pamphlet *Advanced Placement and Transfer Credit for First-Year Engineering Students*, which may be obtained from the Engineering Advising Office, 167 Olin Hall.

Transfer Credit

Undergraduate students who have completed courses at recognized and accredited colleges may, under certain conditions, have credits for such courses transferred to Cornell. Such courses must represent academic work in excess of that required for the secondary school diploma and must be documented as such in writing by the secondary institution. Courses deemed acceptable for transfer credit must be equivalent in scope and rigor to courses at Cornell. Transfer credit will not be awarded for courses taken during a semester in which the student is enrolled at Cornell.

- To apply for transfer credit, students must complete and submit a Transfer Credit Form (one form for each request), accompanied by a course description. (Transfer Credit Forms are available from the Engineering Advising or Registrar's offices and should be submitted prior to enrollment.) An official transcript from the offering institution (bearing the institutional seal and registrar's signature) must be sent to the Engineering Registrar's office before official transfer credit will be awarded.
- To apply for transfer credit to satisfy requirements in mathematics, science, engineering courses, or First-Year Writing Seminars, a student must receive approval from the department offering an equivalent course at Cornell. The department certifying the course may require course materials, textbooks used, etc., in addition to the course description before approving the course.
- Departmental approval is not required to apply for transfer credit which satisfies liberal studies distribution requirements. The course will be reviewed for approval by a representative of the Committee on Academic Standards, Petitions, and Credit (ASPAC) in the Engineering Advising Office.
- Cornell does not award credit for courses in which a student has earned a grade of less than C; schools and departments may stipulate a higher minimum grade.
- College courses completed under the auspices of cooperative college and high school programs will be considered for advanced placement credit only if students demonstrate academic proficiency by taking the appropriate AP or Cornell departmental placement examination, as described in the Advanced Credit section.
- Following matriculation, students may apply up to 18 credits of transfer and/or Cornell extramural credit toward bachelor's degree requirements.
- Transfer students may transfer up to 36 credits for each year spent in full-time study at another institution, provided that the courses are acceptable for meeting graduation requirements.
- No more than 72 total transfer credits (combination of those taken both before and after matriculation) may be used to meet graduation requirements.
- Summer session courses taken at Cornell are not considered transfer credit.
- A more detailed description of the college's regulations governing transfer credit may be found in the pamphlet, *Advanced Placement and Transfer Credit for First-Year Engineering Students,* as well as *The Engineering Undergraduate Handbook*, both available from the Engineering Advising Office, 167 Olin Hall.

Academic Standing

Full-time students are expected to remain in good academic standing. The criteria for good standing changes somewhat as a student progresses through the four years of the engineering curriculum. At all times, the student must be making adequate progress toward a degree, but what this actually means varies from field to field.

Requirements for freshman engineering students to be in good standing at the end of the first semester are as follows. Failure to meet these standards will result in a review by the Committee on Academic Standards, Petitions, and Credit (ASPAC), and the actions of warning, stern warning, required leave of absence, or withdrawal from the College of Engineering may be taken.

1. At least 12 credits passed, including at least two courses from mathematics, science, and/or engineering
2. A C- or better in the mathematics course
3. A semester average of 2.0 or higher
4. No F, U, or INC grades

Requirements for second-semester freshman and first-semester sophomores to be in good standing are as follows. Failure to meet these standards will result in a review by the Committee on Academic Standards, Petitions, and Credit (ASPAC), and the actions of warning, stern warning, required leave of absence, or withdrawal from the College of Engineering may be taken.

1. At least 14 credits passed in courses that meet engineering degree requirements
2. A C- or better in the mathematics course, if one was taken
3. A semester average of 2.0 or higher
4. No F, U, or INC grades

Academic Progress

The total number of credits required for graduation range from 123 to 133, depending on the field program. Therefore, an average semester credit load ranges from approximately 15 to 17 credits.

Because mathematics is pivotal to the study and practice of engineering, students must earn a grade of C- or better in MATH 191 (or 190), 192, 293, and 294. Those who fail to meet this standard are allowed to repeat a course once in the following semester. Failure to achieve at least a C- the second time will generally result in withdrawal from the College of Engineering. Physics and advanced mathematics courses often have mathematics prerequisites, and having to repeat the prerequisite course may delay progress in the physics and mathematics curricula.

Dean's List

Dean's List citations are presented each semester to engineering students with exemplary academic records. The criteria for this honor are determined by the dean of the college. For 2001–2002, the requirement is a semester average of 3.4 or higher (without rounding); no failing, unsatisfactory, missing, or *incomplete* grades (even in physical education); and at least 12 letter-grade credits (not S-U). Students may earn Dean's List status retroactively if they meet these criteria after making up incomplete grades. Students who earn Dean's List status receive certificates from the Engineering Registrar's Office, and the honor is noted on the transcript.

Graduating with Distinction and Honors Program

Graduating with Distinction

Meritorious students graduating with a Bachelor of Science degree from the College of Engineering may also be designated *cum laude*, *magna cum laude*, or *summa cum laude*.

- Cum laude will be awarded to all engineering students with an overall GPA ≥ 3.5. Cum laude will also be awarded to all engineering students who received a semester GPA ≥ 3.5 in each of the last four semesters of attendance at Cornell; in each of these semesters, at least 12 letter graded credits must be taken with no failing, unsatisfactory, missing, or incomplete grades. If the student is an engineering co-op student, then the engineering co-op summer term will count as one of the last four. Students who were approved for pro-rated tuition in their final semester will be awarded cum laude if they received a semester GPA ≥ 3.5 in their last semester and meet the conditions above in the prior four semesters.
- Magna cum laude will be awarded to all engineering students with an overall GPA ≥ 3.75 (based on all credits taken at Cornell).
- Summa cum laude will be awarded to all engineering students with an overall GPA ≥ 4.0 (based on all credits taken at Cornell).

Note: All GPA calculations are minimums and are not rounded.

Field Honors Program

To be eligible for field honors, a student must enter a program with and maintain a cumulative GPA of ≥ 3.5. If the student's major field has an approved honors program and both the GPA and program requirements are fulfilled, the faculty of the field may recommend that a student graduate with the additional diploma and transcript notation of "With Honors." For more specific information, see the field program outline in this catalog.

S-U Grades

Many courses offered by the university may be taken either for a letter grade or for an S-U (satisfactory or unsatisfactory) grade designation. Under the S-U option, students earning the letter grade equivalent of C- or better in a course will receive a grade of S; those earning less than C- receive a grade of U. (Any course in which a U grade is received does not count toward graduation requirements.)

Engineering students may choose to receive an S-U grade option under the following conditions:

- The course in question must be offered with an S-U option.
- The student must have previously completed at least one full semester of study at Cornell.
- The proposed S-U course must count as either a liberal studies distribution or an approved elective in the engineering curriculum.
- Students may only elect to enroll S-U in one course each semester in which the choice between letter grade and S-U is an option. (Additional courses offered "S-U only" may be taken in the same semester as the "elected S-U" course.)

The choice of grading option for any course is initially made during the pre-enrollment period. Grading options may be changed, however, by submitting a properly completed Add/Drop Form to the Engineering Registrar by the end of the third week of classes. After this deadline, the grading option may not be changed, nor will a student be permitted to add a course in which they were previously enrolled (in the current semester) under a different grade option.

Residence Requirements

Candidates for an undergraduate degree in engineering must spend at least four semesters or an equivalent period of instruction as full-time students at Cornell. They must also spend at least three semesters of this time affiliated with an engineering field program or with the College Program.

Students who are on a voluntary leave of absence are permitted to register for courses extramurally only with the approval of their field (or the college, for unaffiliated students). No more than 18 credits earned through extramural study or acquired as transfer credit (or a combination thereof) after matriculation may be used to satisfy the requirements for the bachelor's degree in engineering.

Degree candidates may spend periods of time studying away from the Cornell campus with appropriate authorization. Information on programs sponsored by other universities and on procedures for direct enrollment in foreign universities is available at the Cornell Abroad Office, 474 Uris Hall. Programs should be planned in consultation with the staff of the Engineering Advising Office, who can provide information on credit-evaluation policies and assist in the petitioning process.

Transferring within Cornell

It is not uncommon for students to change their academic or career goals after matriculation in one college and decide that their needs would be better met in another college at Cornell. While transfer between colleges is not guaranteed, efforts are made to assist students in this situation.

The office responsible for assisting students with the transfer process is the Internal Transfer Division Office. Students who wish to transfer out of the College of Engineering to another college at Cornell should consult initially with the Engineering Advising Office.

Students who wish to transfer into the College of Engineering can apply at the Engineering Advising Office—application forms are available in 167 Olin Hall. Students who would enter the college as second-semester sophomores or later must be accepted by a field program as part of the admission process. Students who would enter as a second-semester freshman or first-semester sophomore may be accepted into the college without the requirement of field affiliation but must be sponsored by a field program.

Students who hope to transfer into engineering should take courses in mathematics, chemistry, computer science, physics, and engineering that conform to the requirements of the Common Curriculum. Interested students should discuss their eligibility with an adviser in the Engineering Advising Office, 167 Olin Hall.

Leave of Absence

A leave of absence may be voluntary, medical, or required. A description of each follows:

Voluntary Leave: Students sometimes find it necessary to suspend their studies. To do this, students must petition for a leave of absence for a specified period of time and receive written approval.

Affiliated students request leave through their fields. Unaffiliated students request leave through the Engineering Advising Office; the first step is an interview to establish conditions for the leave and subsequent return. Those who take a leave before affiliating with a field and while not in good standing may be given a "conditional leave." This requires them to meet specific conditions, established at the time the leave is granted, before they will be reinstated.

Leaves of absence are not generally granted for more than two years. A leave of absence granted during a semester goes into effect on the day it is requested and lasts for a *minimum of six months*. If a leave is requested after the twelfth week of a semester, the courses in which the student was registered at the time of the request are treated as having been dropped (i.e., a "W" will appear on the transcript for each course). Students who owe money to the university are ineligible for leaves of absence. If courses taken during a leave are to satisfy Cornell degree requirements, they must be approved *in advance* through a formal transfer petition. (See previous section of Transer Credit for details.)

Students who intend to take a leave of absence should check with the Office of Financial Aid and Student Employment to discuss financial implications; this is especially true for those who have taken out educational loans. Medical insurance eligibility may also be affected.

To return after a leave of absence, the conditions established when the leave was granted must be satisfied, and the college must be notified in writing, at least six weeks before the beginning of the semester the student plans to return.

Medical Leave: Medical leaves are granted by the college only upon recommendation by a physician from Gannett Health Center. Such leaves are granted for at least six months and up to five years with the understanding that the student may return at the beginning of any term after the medical condition in question has been corrected. Students must satisfy the Gannett Health Center that the condition has been corrected before they may return. The student's academic standing will also be subject to review both at the time the leave is granted and upon the student's return.

Required Leave: A required leave of absence is imposed in cases where the academic progress of a student is so poor that continuing into the next semester does not appear prudent. An example where a leave of absence would be required might be failure in several courses in a semester. Unless the student is ahead in the curriculum, returning later to repeat the semester makes better academic sense than continuing without the necessary background. In many cases, the leave is dictated by courses that are only offered in the fall or the spring semester. Leaves are given when the probability of success is increased substantially by deferring the student's return by one semester (or, in unusual circumstances, one year).

Rejoining the College

Students wishing to rejoin the college who have not yet affiliated with a field should request permission to rejoin in a letter to the Engineering Advising Office; affiliated students should contact their field office. This must be

done at least six weeks before the beginning of the semester in which the student wishes to return. The letter should describe the student's activities while away from Cornell, detail any academic work completed during this time, and specify the courses the student intends to take upon return.

Withdrawal from the College

A withdrawal from the College of Engineering may be voluntary or required. Following is a description of each:

Voluntary Withdrawal: Students who voluntarily withdraw from the engineering degree program sever all connection with the college. Unaffiliated students who wish to withdraw should do so through the Engineering Advising Office. Affiliated students should contact their field office. If a withdrawal is requested during the semester, courses in which the student is enrolled must be dropped in accordance with applicable regulations.

Any student who fails to register in the first three weeks of the semester, without benefit of a leave of absence or permission for study in absentia, will be deemed to have withdrawn.

Students who withdraw from the College of Engineering are eligible to apply for admission to one of the other six colleges at Cornell. The intra-university transfer process should be followed.

If students who have withdrawn subsequently wish to return, they must make a formal application for readmission. This is rarely granted. It is subject to a review of the student's academic background and depends on available space in the college and in the student's major field.

Required Withdrawal: Students are required to withdraw from the college only when their overall record indicates that they are either incapable of completing the program or not sufficiently motivated to do so. This action only withdraws them from the College of Engineering and does not, in and of itself, adversely affect their ability to transfer and complete a degree in one of the other colleges in the university.

ENGINEERING, COOPERATIVE EDUCATION, AND CAREER SERVICES

This office assists engineering students (freshmen through Ph.D.) in career development and job search issues, and administers the Engineering Cooperative Education Program (see separate entry under the Engineering Special Programs section). Individual advising and group seminars are available, and more than 300 national employers visit the office annually to recruit technical students and graduates; additional job opportunities are posted electronically. Both undergraduate and graduate students can use these services to pursue permanent or summer employment opportunities; however, students seeking co-op opportunities must meet specific requirements. Further information on all services is available from the Engineering Cooperative Education and Career Services Office, 201 Carpenter Hall (255–5006), and on the web at www.career.cornell.edu and www.engr.cornell.edu/coop.

AGRICULTURAL AND BIOLOGICAL ENGINEERING

M. F. Walter, chair; B. A. Ahner, L. D. Albright, D. J. Aneshansley, A. J. Baeumner, J. A. Bartsch, J. R. Cooke, A. K. Datta, K. G. Gebremedhin, D. A. Haith, J. B. Hunter, L. H. Irwin, W. J. Jewell, D. Luo, C. D. Montemagno, J.-Y. Parlange, N. R. Scott, T. S. Steenhuis, M. B. Timmons, L. P. Walker

Bachelor of Science Curriculum

Agricultural and Biological Engineering is at the focus of three great challenges facing humanity today: ensuring an adequate and safe food supply in an era of expanding world population; protecting and remediating the world's natural resources, including water, soil, air, energy and biodiversity; and developing engineering systems that monitor, replace, or intervene in the biology of living organisms. The undergraduate engineering program in the Department of Agricultural and Biological Engineering has a unique focus on biological systems, including the environment, that is realized through a combination of fundamental engineering sciences, biology, applications courses, and liberal studies. The program leads to a Bachelor of Science degree and is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET).

Two concentrations in Agricultural and Biological Engineering are offered: biological engineering and environmental engineering. All students, regardless of concentration, take courses in mathematics, statistics, computing, physics, chemistry, basic and advanced biology, fundamental engineering sciences (mechanics, thermodynamics, fluid mechanics, and transport processes), engineering applications, and design. Students select application courses in the department in areas that include bioprocessing, soil and water management, bioenvironmental and facilities engineering, bioinstrumentation, engineering aspects of animal physiology, environmental systems analysis, and waste treatment and disposal. Students select other courses in the College of Engineering that strengthen their program, such as environmental sciences or biomedical engineering. Students planning for medical school also take additional lab-based courses in biology and organic chemistry. Throughout the curriculum, emphasis is placed on communications and teamwork skills.

Many undergraduate students participate in teaching assistantships, research assistantships, design teams, Engineering Coop, and study abroad. Students should have a strong aptitude for the sciences and mathematics and an interest in the complex social issues that surround technology.

The department also participates in the interdisciplinary major, Science of Earth Systems (SES). Students in the joint program may minor in SES by taking 18 credits of engineering and science electives as part of their engineering program.

Career opportunities cover the spectrum of private industry, public agencies, educational institutions, and graduate and professional programs in engineering, science, medicine, law, and other fields. In recent years, graduates have developed careers in environmental consulting, biotechnology, the pharmaceutical industry, biomedical engineering, management consulting, and international development.

The living world is all around us, and within us. The biological revolution continues and it has given rise to a growing demand for engineers who have studied biology and the environment, who have strong math and science skills, who can communicate effectively, and who are sensitive to the needs of people and who are interested in the challenges facing society. Agricultural and Biological Engineering is educating the next generation of engineers to meet these challenges.

The department of Agricultural and Biological Engineering is located in Riley-Robb Hall and operates specialized facilities that are among the largest and most complete of their kind in the world. For further details see the department's undergraduate programs publication, available at 207 Riley-Robb Hall, or contact the field's advising coordinator, Professor Jim Bartsch, at 255–2800.

The field program requirements for those students joining the program in 2001–2002 are outlined below.

Basic Subjects	*Credits*
MATH 191 (or 190), 192, 293, 294 Calculus for Engineers and Engineering Mathematics	16
Physics I and II (112 and 213)*	8
General Chemistry (207 or 211 or 215)*	4
Organic Chemistry (257 or 357)*	3
ABEN 151, Introduction to Computing	4
Biological Sciences*	12
Introductory	6–8
Advanced	6–4
Engineering Field Courses	
ABEN 200, The ABEN Experience	1
ENGRD 202, Mechanics of Solids	3
ABEN 250, ENGR Applications	3
ABEN 350, Bio & Environ Transport Proc	3
ENGRD 221, Thermodynamics	3
Statistics and Probability (ENGRD 270 or CEE 304)	3
Fluid Mechanics (CEE 331 or M&AE 323 or CHEME 323)	3–4
Upper-Level ABEN courses (3 courses numbered 450–490; at least one of these must be an approved capstone design course)	9
Technical Engineering Electives (200 level or above; at least one of these must be an approved laboratory experience course)	17–18
Liberal Studies (two freshmen seminars and at least two courses in humanities or history)	24
Approved Electives	6
Total (minimum)	123

*Basic accredited curriculum. Specializations (options or pre-professional study) may be accommodated by selection of alternative or additional courses in the indicated area(s). For further information, please contact the undergraduate program office, 207 Riley Robb

Hall or contact the field's advising coordinator, Professor Jim Bartsch at jab35@cornell.edu.

Agricultural and Biological Engineering Honors Program

Eligibility

The Bachelor of Science degree with honors will be granted to engineering students who, in addition to having completed the requirements for a bachelor's degree, have satisfactorily completed the honors program in the Department of Agricultural and Biological Engineering and have been recommended for the degree by the honors committee of the department. An honor's program student must enter with and maintain a cumulative GPA ≥ 3.5.

Content

An ABEN honors program shall consist of at least nine credits beyond the 123 credit minimum required for graduation in ABEN. These nine credits shall be drawn from one or more of the following with at least four credit hours in the first category:

- A significant research experience or honors project under the direct supervision of an ABEN faculty member using ABEN 499, Undergraduate Research. A written senior honors thesis must be submitted as part of this component.
- A significant teaching experience under the direct supervision of a faculty member or as part of a regularly recognized course in the department (e.g., ABEN 151 or 250) under ABEN 498, Undergraduate Teaching.
- Advanced or graduate courses. These additional courses must be technical in nature, i.e., in engineering, mathematics, biology, chemistry and physics at the 400+ and graduate level.

Note: no research, independent study, or teaching for which the student is paid may be counted toward the honors program.

Timing

All interested students must complete a written application no later than the end of the third week of the first semester of their senior year, but are encouraged to make arrangements with a faculty member during the second semester of their junior year. A student must be in the program for at least two semesters before graduation.

Procedures

Applications are available in the ABEN undergraduate program office, 207 Riley Robb.

Each applicant to the ABEN honors program must have an ABEN faculty adviser to supervise the honors program. Written approval of the faculty member who will direct the research is required.

Option in Environmental Engineering

The Environmental Engineering Option provides ABEN students the opportunity to follow a structured environmental engineering curriculum. The curriculum was developed and approved jointly by the faculty of ABEN and Civil and Environmental Engineering (CEE). The Environmental Engineering Option in ABEN and CEE share a common core of courses.

Students complete a prescribed program of courses within the framework of the ABEN curriculum (See pp. XX)

Chemistry/microbiology: Students must take at least two semesters of chemistry (CHEM 211/257 or CHEM 207/208). They must also satisfy the ABEN organic chemistry requirement: either by taking organic chemistry as one of the two required chemistry courses (i.e., CHEM 257) or by taking CEE 451. The microbiology requirement of the Environmental Engineering option can also be met by taking CEE 451.

Chemistry: CHEM 211/257 or CHEM 207/208

Organic chemistry: CHEM 257 or CEE 451

Microbiology: CEE 451 or BIOMI 290

Fluid Mechanics: CEE 331

Probability and Statistics: CEE 304

Environmental Engineering: CEE 351

Environmental Quality Engineering: CEE 453

Laboratory Experience in Environmental Engineering: ABEN 473 or 475: Watershed Engineering or Environmental Systems Analysis

Remaining program requirements are stated on pp. XX.

Inquiries regarding this option should be addressed to the student's adviser or to Jim Bartsch, Undergraduate Advising Coordinator at jab35@cornell.edu.

Minor in Biological Engineering

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the Biological Engineering minor: A&EP, CEE, CHEME, COM S, EAS, ECE, M&AE, MS&E, and OR&IE. (Students may participate in either the Bioengineering Option **or** the Biological Engineering minor, but not both.)

Note: Students should meet with the ABEN Program Coordinator as soon as they decide to pursue the minor. Then they will receive an ABEN faculty adviser, who will assist them in completing the minor program.

Biological Engineering is the application of engineering to living systems. Examples of engineering efforts in this field include the development of new biosensor technologies, study and control of biologically based matter transformation systems, and development of engineered devices to study and regulate fundamental biological processes. The Biological Engineering minor is an opportunity for students to further their understanding of living systems and to increase their knowledge of the basic transport processes that occur within these systems. Courses in the minor provide opportunities to analyze and manipulate living systems at the molecular, cellular and system levels.

Requirements

To complete the minor, the student must take at least six (6) courses (minimum of 18 credits), which meet the following requirements:

Required Course: ABEN 350, Biological & Environmental Transport Processes

I. Analysis: Require two (2) from the following courses:

MS&E 304 (3)	Kinetics, Diffusion, and Phase Transformations
CHEME 313 (3)	Chemical Engineering Thermodynamics
CHEME 390 (3)	Reaction Kinetics and Reactor Design
ABEN 411 (3)	Biomass Processing: Modeling and Analysis
CEE 437 (3)	Experimental Methods in Fluid Dynamics
ABEN 685 (4)	Biological Engineering Analysis

II. Application: Require two (2) from the following courses:

ABEN 450 (4)	Bioinstumentation
ABEN 453 (3)	Computer-Aided Engineering Applications to Biomedical and Food Processes
ABEN 454 (3)	Physiological Engineering
ABEN 458 (3)	Biotechnology: Principles and Application
ABEN 482 (3)	Biothermal Engineering
ABEN 655 (3)	Thermodynamics and Its Applications
ABEN 658 (3)	Biosensors and Bioanalytical Techniques
CHEME 643 (3)	Introduction to Bioprocess Engineering

III. Basic Sciences: One (1) from the following courses:

BIOBM 233 (3)	Introduction to Biomolecular Structure
BIOMI 290 (3)	General Microbiology
BIOBM 330–333 (2–4)	Principles of Biochemistry
BIOBM 434 (3)	Applications of Molecular Biology
BIONB 470 (3)	Biophysical Methods

Academic Standards: A letter grade of C- or better for each course in the minor.

Minor in Environmental Engineering

(Offered in cooperation with the School of Civil and Environmental Engineering)

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the environmental engineering minor: A&EP, CHEME, COM S, EAS, ECE, M&AE, MS&E, OR&IE. A fundamental challenge for the engineering profession is development of a sustainable society and environmentally responsible industry and agriculture reflecting an integration of economic and environmental objectives. We are called upon to be trustees and managers of our nation's resources, the air in our cities, and use and quality of water in our aquifers, streams, estuaries, and coastal areas. This minor encourages engineering students to learn about the scientific, engineering, and economic foundations of environmental engineering so that they are better able to address environmental management issues. The requirements for the environmental engineering minor are outlined below. For further details consult the Agricultural and Biological Engineering Undergraduate Programs Office, 207 Riley-

Robb Hall, or the Civil and Environmental Engineering Undergraduate Programs Office, 221 Hollister Hall.

Requirements

To complete the minor, the student must take at least six courses (minimum of 18 credits), chosen as follows.

Students must select courses from the following group listings, with at least one course from each group.

Group A. Environmental Engineering Processes:

CEE 351	Environmental Quality Engineering
CEE 352	Water Supply Engineering
CEE 451	Microbiology for Environmental Engineering
CEE 453	Laboratory Research in Environmental Engineering
ABEN 476	Solid Waste Engineering
ABEN 478	Ecological Engineering
CEE 644	Environmental Applications of Geotechnical Engineering
ABEN 651	Bioremediation
CEE 653	Water Chemistry for Environmental Engineering
CEE 655	Pollutant Transport and Transformation in the Environment
CEE 658	Sludge Treatment, Utilization, and Disposal
CEE 654	Aquatic Chemistry

Group B. Environmental Systems:

ENGRI 113*	Introduction to Environmental Systems (*May count only if taken before the student's junior year.)
ABEN 475	Environmental Systems Analysis
CEE 529	Water and Environmental Resources Problems and Policies
CEE 597	Risk Analysis and Management
CEE 623	Environmental Quality Systems Engineering
ABEN 678	Nonpoint Source Models

Group C. Hydraulics, Hydrology, and Environmental Fluid Mechanics:

CEE 331	Fluid Mechanics (CHEME 323 or M&AE 323 may be substituted for CEE 331)
CEE 332	Hydraulic Engineering
ABEN 371	Hydrology and the Environment
CEE 431/ ABEN 471	Geohydrology
CEE 432	Hydrology
CEE 435	Coastal Engineering
CEE 437	Experimental Methods in Fluid Dynamics
ABEN 473	Watershed Engineering
ABEN 474	Drainage and Irrigation Systems
CEE 633	Flow in Porous Media and Groundwater
CEE 655	Pollutant Transport and Transformation in the Environment
ABEN 671	Analysis of the Flow of Water and Chemicals in Soils
ABEN 672	Drainage

Academic Standards: A letter grade of C- or better in each course in the minor and a cumulative GPA of 2.0 or better for all courses in the minor.

Master of Engineering (Agricultural and Biological) Degree Program

The program for the M.Eng. (Agricultural and Biological) degree is intended primarily for those students who plan to enter engineering practice. The curriculum is planned as an extension of an undergraduate program in agricultural and biological engineering but can accommodate graduates of other engineering disciplines. The curriculum consists of 30 credits of courses intended to strengthen the students' fundamental knowledge of engineering and develop their design skills. At least three to nine of the required 30 credits are earned for an engineering design project that culminates in a written and oral report.

The program is designed to be flexible so that the candidate may concentrate in any of a variety of specialty areas: biological engineering, energy, environmental engineering, environmental management, food processing engineering, international agriculture, local roads, machine systems, soil and water engineering, and structures and environment. Elective courses are chosen from among engineering subject areas relevant to the student's interests and design project. Courses in technical communication, mathematics, biology, and the physical sciences may also be taken as part of a coherent program. Master of Engineering students in Agricultural and Biological Engineering can qualify for the Dean's Certificate in energy, manufacturing, or bioengineering by choosing their design project and a number of electives from the designated topic areas. More information is available from the ABEN Student Services Office, 207 Riley Robb Hall (255–2173), or by e-mail at abengradfield@cornell.edu.

APPLIED AND ENGINEERING PHYSICS

R. A. Buhrman, director; F. W. Wise, associate director for undergraduate studies; A. L. Gaeta, director of graduate studies, J. D. Brock, T. A. Cool, H. G. Craighead, M. S. Isaacson, V. O. Kostroun, B. R. Kusse, M. Lindau, R. V. E. Lovelace, L. Pollack, J. Silcox, W. W. Webb; adjunct faculty: D. H. Bilderback; senior research associate: E. J. Kirkland

Bachelor of Science Curriculum

The undergraduate engineering physics curriculum is designed for students who want to pursue careers of research or development in applied science or advanced technology and engineering. Its distinguishing feature is a focus on the physics and mathematics fundamentals, both experimental and theoretical, that are at the base of modern engineering and research and have a broad applicability in these areas. By choosing areas of concentration, the students may combine this physics base with a good background in a conventional area of engineering or applied science.

The industrial demand for engineering physics graduates with baccalaureates is high, and many students go directly to industrial positions where they work in a variety of areas that either combine, or are in the realm of, various more conventional areas of engineering. Recent examples include bioengineering, computer technology, electronic-circuit and instrumentation design, energy conversion, environmental engineering, geological analysis, laser and optical technology, microwave technology, nuclear technology, software engineering, solid-state-device development, technical management, and financial consulting. A number of our graduates go on for advanced study in all areas of basic and applied physics, as well as in a diverse range of areas in advanced science and engineering. Examples include applied physics, astrophysics, atmospheric sciences, biophysics, cell biology, computer science and engineering, electrical engineering, environmental science, fluid mechanics, geotechnology, laser optics, materials science and engineering, mechanical engineering, medical physics, mathematics, medicine, nuclear engineering, oceanography, and physics. The undergraduate program can also serve as an excellent preparation for medical school, business school, or specialization in patent law.

The Engineering Physics program fosters this breadth of opportunity because it both stresses the fundamentals of science and engineering and gives the student direct exposure to the application of these fundamentals. Laboratory experimentation is emphasized, and ample opportunity for innovative design is provided. Examples are ENGRI 110, The Laser and Its Applications in Science, Technology, and Medicine (a freshman Introduction to Engineering course); ENGRD/A&EP 264, Computer-Instrumentation Design (a recommended sophomore engineering distribution course); A&EP 330, Modern Experimental Optics (a junior/senior course); A&EP 363, Electronic Circuits (a sophomore/junior course); PHYS 410, Advanced Experimental Physics; and A&EP 438, Computational Engineering Physics (a senior computer laboratory).

Undergraduates who plan to enter the field program in Engineering Physics are advised to arrange their Common Curriculum with their developing career goals in mind. Students are also encouraged to take PHYS 112 or PHYS 116 during their first semester (if their advanced placement credits permit) and are recommended to satisfy the computing applications or technical writing requirement with the engineering distribution course ENGRD 264. Engineering physics students need to take only two engineering distribution courses, since A&EP 333, which they take in their junior year, counts as a third member of this category. Engineering Physics students are advised to take A&EP 363 in the spring semester of the sophomore year. Students with one semester of advanced placement in math, who have received a grade of A- or better in MATH 192, may wish to explore accelerating their mathematics requirements so as to enroll in A&EP 321 and 322 in the sophomore year. For advice on this option, consult with the A&EP associate director.

In addition to the requirements of the Engineering Common Curriculum,* the upperclass course requirements of the field program are as follows:

Course	*Credits*
A&EP 333, Mechanics of Particles and Solid Bodies	4
A&EP 355, Intermediate Electromagnetism	4
A&EP 356, Intermediate Electrodynamics	4
A&EP 361, Introductory Quantum Mechanics	4
A&EP 363, Electronic Circuits	4
A&EP 423, Statistical Thermodynamics	4
A&EP 434, Continuum Physics	4
PHYS 410, Advanced Experimental Physics	4
A&EP 321, Mathematical Physics I; or MATH 421 (applied mathematics)	4
A&EP 322, Mathematical Physics II; or MATH 422 (applied mathematics)	4
Applications of quantum mechanics†	3 or 4

Five field-approved electives (15–19 credits), of which four must be technical. The technical electives are expected to be upper-level courses (300 or above).

Total field credits=58 credit hours minimum.

*The Engineering Common Curriculum allows students to take only four courses each semester of their freshman year if they so desire. This course load is fully consistent with the requirements of the EP major, but entering students with strong preparation are encouraged to consider taking an additional course during one or both semesters of the freshman year so that they may have additional flexibility in developing a strong, individualized educational program in their latter years, and for allowing options such as a semester or year abroad or early graduation.

†Some courses (though the list is not all-inclusive) that will satisfy this requirement are PHYS 444, Nuclear and High-Energy Particle Physics; PHYS 454, Introductory Solid-State Physics; A&EP 438, Computational Engineering Physics; A&EP 440, Quantum and Nonlinear Optics; A&EP 609, Nuclear Physics for Applications; ECE 430, Lasers and Optical Electronics; and ECE 531, Quantum Electronics I.

Two of the four credits of PHYS 410 required for the BS degree in Engineering Physics can be satisfied by successfully completing A&EP/PHYS 330. The remaining two credits of PHYS 410 can then be satisfied by taking PHYS 400 for two credits, provided that the experiments completed in PHYS 400 do not overlap with those in A&EP/PHYS 330. (A list of experiments that are not appropriate will be prepared by A&EP faculty and made available in the A&EP office.) If a student chooses this option, A&EP/PHYS 330 may also count as a technical elective, provided the remaining three technical electives are four credits each.

‡If a scientific computing course was not selected as an engineering distribution course, one of these technical electives may be needed to satisfy the computing applications requirement. For students going on to graduate school a third course in mathematics is recommended.

Choosing elective courses. A distinctive aspect of the Engineering Physics curriculum is the strong opportunity it provides students to develop individualized programs of study to meet their particular educational and career goals. These can include the pursuit of a dual major or the development of a broad expertise in one or more of a number of advanced technical and scientific areas. With at least seven technical and approved electives in the sophomore, junior, and senior years, Engineering Physics majors are encouraged to work closely with their adviser to develop a coherent academic program that is in accordance with those goals. For those students who look toward an industrial position after graduation, these electives should be chosen to widen their background in a specific area of practical engineering. A different set of electives can be selected as preparation for medical, law, or business school. For students who plan on graduate studies, the electives provide an excellent opportunity to explore upper-level and graduate courses, and to prepare themselves particularly well for graduate study in any one of a number of fields. Various programs are described in a special brochure available from the School of Applied and Engineering Physics, Clark Hall. Students interested in these options are advised to consult with their EP adviser, a professor active in their area of interest, or with the associate director of the school, Professor Frank W. Wise.

Electives need not be all formal course work: qualified students are encouraged to undertake independent study under the direction of a member of the faculty (A&EP 490). This may include research or design projects in areas in which faculty members are active.

The variety of course offerings and many electives provide flexibility in scheduling. If scheduling conflicts arise, the school may allow substitution of courses nearly equivalent to the listed required courses.

The Engineering Physics Program requires that a minimum GPA of 2.7 (B-) be attained in all physics and mathematics courses taken by a student before entering the Engineering Physics field unless approval is obtained from the A&EP associate director. To remain in good standing in the field, the engineering physics student is expected to pass every course for which he or she is registered, to earn a grade of C- or better in specifically required courses, and to attain each semester a grade-point average for that semester of at least 2.3.

Engineering Physics Honors Program

Eligibility

The Bachelor of Science degree with honors will be conferred upon those students who, while completing the requirements for a bachelor degree, have satisfactorily completed the honors program in the Department of Engineering Physics and have been recommended for the degree by the honors committee of the department. An honors program student must enter with and maintain a cumulative GPA≥ 3.5.

Content

The student must

1. Complete at least eight credits of field approved electives at the 400-level or higher and receive a minimum grade of an A- in each of the courses taken to fulfill this eight-credit requirement. These eight credits are in addition to the credits obtained by completing the senior thesis or special project requirement as discussed in item 2.
2. Enroll in A&EP 490 or an equivalent course over two semesters for the purpose of completing an independent research project or senior thesis under the supervision of a Cornell engineering or science faculty member. The minimum enrollment is to be two credits in the first semester and four credits in the second. The level of work required for a successful completion of this project or thesis is to be consistent with the amount of academic credit granted.

Timing

All interested students must complete a written application no later than the end of the third week of the first semester of their senior year, but are encouraged to make arrangements with a faculty member during the second semester of their junior year. A student must be in the program for at least two semesters before graduation.

Procedures

Before enrolling in A&EP 490, or the equivalent, the honors candidate must submit a brief proposal outlining the topic and scope of the proposed project or thesis and a faculty supervisor's written concurrence to the associate director for undergraduate studies. This proposal will be reviewed by the A&EP Honors Committee and either approved or returned to the candidate to correct deficiencies in the proposal. The proposed research project or senior thesis is to consist of a research, development, or design project and must go beyond a literature search. The final steps in completing the honors project are a written and oral report. The written report is to be in the form of a technical paper with, for example, an abstract, introduction, methods section, results section, conclusions section, references, and figures. This report will be evaluated by the faculty supervisor and the chair of the A&EP Honors Committee. Following the completion of the written report, an oral report is to be presented to an audience consisting of the faculty supervisor, the chair of the Honors Committee, and at least one other departmental faculty member, along with the other honors candidates. The final research project course grade will be assigned by the faculty supervisor, following the oral presentation and after consultation with the chair of the Honors Committee. A minimum grade of A- is necessary for successful completion of the honors requirement.

Master of Engineering (Engineering Physics) Degree Program

The M.Eng. (Engineering Physics) degree may lead directly to employment in engineering design and development or may be a basis for further graduate work. Students have the opportunity to broaden and deepen their preparation in the general field of applied physics, or they may choose the more specific option of preparing for professional engineering work in a particular area such as laser and optical technology, nanostructure science and technology, device physics, materials characterization, or software engineering. A

wide latitude is allowed in the choice of the required design project.

One example of a specific area of study is solid-state physics and chemistry as applied to nano-structure science and technology. Core courses in this specialty include the micro-characterization of materials (A&EP 661) and the microprocessing and microfabrication of materials (A&EP 662). The design project may focus on such areas as semiconductor materials, device physics, nanostructure technology, or optoelectronics. Another area of study may be applied optics where core courses can be chosen from applied physics, electrical engineering, and physics.

Each individual program is planned by the student in consultation with the program chair. The objective is to provide a combination of a good general background in physics and introductory study in a specific field of applied physics. Candidates may enter with an undergraduate preparation in physics, engineering physics, or engineering. Those who have majored in physics usually seek advanced work with an emphasis on engineering; those who have majored in an engineering discipline generally seek to strengthen their physics base. Candidates coming from industry usually want instruction in both areas. All students granted the degree will have demonstrated competence in an appropriate core of basic physics; if this has not been accomplished at the undergraduate level, subjects such as electricity and magnetism, or classical, quantum, and statistical mechanics should be included in the program.

The general requirement for the degree is a total of 30 credits for graduate-level courses or their equivalent, earned with a grade of C or better and distributed as follows:

1) a design project in applied science or engineering with a written final report (not less than 6 nor more than 12 credits)
2) an integrated program of graduate-level courses, as discussed below (17 to 23 credits)
3) a required special-topics seminar course (one credit)

The design project, which is proposed by the student and approved by the program chair, is carried out on an individual basis under the guidance of a member of the university faculty. It may be experimental or theoretical in nature; if it is not experimental, a laboratory physics course is required.

The individual program of study consists of a compatible sequence of courses focused on a specific area of applied physics or engineering. It's purpose is to provide an appropriate combination of physics and physics-related courses (applied mathematics, statistical mechanics, applied quantum mechanics) and engineering electives (such as courses in biophysics, chemical engineering, electrical engineering, materials science, computer science, mechanical engineering, or nuclear engineering). Additional science and engineering electives may be included. Some courses at the senior level are acceptable for credit toward the degree; other undergraduate courses may be required as prerequisites but are not credited toward the degree.

Students interested in the M.Eng. (Engineering Physics) degree program should contact Professor Bruce Kusse.

APPLIED MATHEMATICS

The Center for Applied Mathematics administers a broadly based interdepartmental graduate program that provides opportunities for study and research in a wide range of the mathematical sciences. For detailed information on opportunities for graduate study in applied mathematics, contact the director of the Center for Applied Mathematics, 657 Frank H. T. Rhodes Hall.

There is no special undergraduate degree program in applied mathematics. Undergraduate students interested in application-oriented mathematics may select an appropriate program in the Department of Mathematics or one of the departments in the College of Engineering.

A list of selected graduate courses in applied mathematics may be found in the description of the Center for Applied Mathematics, in the section "Interdisciplinary Centers and Programs."

CHEMICAL ENGINEERING

M. L. Shuler, director; A. B. Anton, L. A. Archer, P. Clancy, C. Cohen, T. M. Duncan, J. R. Engstrom, F. A. Escobedo, D. L. Koch, K. H. Lee, W. L. Olbricht, W. M. Saltzman, P. H. Steen

Bachelor of Science Curriculum

The undergraduate field program in Chemical Engineering comprises a coordinated sequence of courses beginning in the sophomore year and extending through the fourth year. Special programs in biochemical engineering and polymeric materials are available. Students who plan to enter the field program take CHEM 208 during the freshman year. The program for the last three years, for students who have taken an Introduction to Engineering course during the first year is as follows:

Semester 3	*Credits*
MATH 293, Engineering Mathematics	4
PHYS 213, Electricity and Magnetism	4
CHEM 389, Physical Chemistry I (engineering distribution)	4
ENGRD 219, Mass and Energy Balances (engineering distribution)	3
Humanities or social sciences	3
Semester 4	
MATH 294, Engineering Mathematics	4
CHEM 290–391, Physical Chemistry (field)	6
ENGRD 222 or 241	3
Humanities or social sciences	3
Semester 5	
CHEM 357, Introductory Organic Chemistry	3
CHEM 251, Organic Chemistry Laboratory	2
CHEME 313, Chemical Engineering Thermodynamics	4
CHEME 323, Fluid Mechanics	3
Humanities or social sciences	3
Semester 6	
Advanced Science elective†	3
CHEME 301, Nonresident Lectures	1
CHEME 324, Heat and Mass Transfer	3
CHEME 332, Analysis of Separation Processes	3
CHEME 372, Introduction to Process Dynamics and Control	1
CHEME 390, Reaction Kinetics and Reactor Design	3
Humanities or social sciences	3
Semester 7	
CHEME 432, Chemical Engineering Laboratory	4
Electives*	9
Humanities or Social Sciences	3
Semester 8	
CHEME 462, Chemical Process Design	4
Humanities or social sciences	3
Electives*	3
Approved elective	3

*The electives in semester seven and eight comprise six credits of field approved electives, and six credits of advanced CHEME electives. Advanced CHEME electives include any CHEME course 400+ level, except CHEME 490, 491, 492, 520, and 572.

†Advanced science electives include BIOMI 290, General Microbiology Lectures; BIOBM 330, 331, 332, and 333, Principles of Biochemistry; CEE 654, Aquatic Chemistry; CHEME 480, Chemical Processing of Electronic Materials; CHEME 481, Biomedical Engineering; CHEME 640, Polymeric Materials; CHEME 643, Introduction to Bioprocess Engineering; FOOD 417, Food Chemistry I; MS&E 206, Atomic and Molecular Structure of Matter; MS&E 305, Electronic Structure of Matter; MS&E 306, Electrical, Optical, and Magnetic Properties of Materials; MS&E 541, Microprocessing of Materials; MS&E 531, Introduction to Ceramics; MS&E 521, Properties of Solid Polymers; T&AM 310, Advanced Engineering Analysis I; any A&EP course numbered 333 or above; any CHEM course numbered 301 or above; any PHYS course numbered 300 or above.

Master of Engineering (Chemical) Degree Program

The professional master's degree, M.Eng. (Chemical), is awarded at the end of one year of graduate study with successful completion of 30 credits of required and elective courses in technical fields including engineering, mathematics, chemistry, physics, and business administration. Courses emphasize design and optimization based on the economic factors that affect design alternatives for processes, equipment, and plants. General admission and degree requirements are described in the college's introductory section.

Specific requirements include

1) two courses in advanced chemical engineering fundamentals chosen from CHEME 711, 713, 731, 732, and 751
2) two courses in applied chemical engineering science chosen from CHEME 480, 520, 564, 566, 640, 643, 656, and 661
3) a minimum of three credits of a design project, CHEME 565

Dean's certificate programs in Bioengineering, Engineering Management, Energy Engineering,

and Manufacturing are available. A program offered jointly with the Food Science Department is also available, leading to both the Master of Engineering and the Master of Professional Studies degrees.

CIVIL AND ENVIRONMENTAL ENGINEERING

J. F. Abel, S. L. Billington, J. J. Bisogni, Jr., W. H. Brutsaert, P. G. Carr, E. A. Cowen, R. A. Davidson, R. I. Dick, L. B. Dworsky, J. M. Gossett, M. D. Grigoriu, D. A. Haith, K. C. Hover, A. R. Ingraffea, F. H. Kulhawy, L. W. Lion, P. L-F. Liu, D. P. Loucks, J. R. Mbwana, A. H. Meyburg, L. K. Nozick, T. D. O'Rourke, K. D. Papoulia, T. Pekoz, W. D. Philpot, M. J. Sansalone, R. E. Schuler, C. A. Shoemaker, J. R. Stedinger, H. E. Stewart, M. A. Turnquist, M. Weber-Shirk, R. N. White

Bachelor of Science Curriculum

The School of Civil and Environmental Engineering (CEE) offers an accredited undergraduate program in civil engineering and permits students to pursue one of two options leading to the B.S. degree: civil engineering or environmental engineering. Within civil engineering, while it is not necessary to do so, students may concentrate in structural engineering, geotechnical engineering, fluid mechanics and hydrology, water resource systems, or transportation. The environmental engineering curriculum emphasizes study of environmental engineering, water resource systems, and fluid mechanics and hydrology. Sample curricula are available in the CEE Undergraduate Program Office, 221 Hollister Hall.

Requirements for Admission to the Field:

Students planning to enter the field program in Civil and Environmental Engineering are required to complete the following courses before or during the first semester of the sophomore year with a grade of C– or better: for the civil option, ENGRD 202, Mechanics of Solids; for the environmental option, either ENGRD 202, Mechanics of Solids or CHEM 208, General Chemistry. In addition, the field requires a cumulative grade point average of at least 2.0 both overall and in engineering and sciences courses.

Recommended Engineering Distribution Courses:

Students in the environmental option are required to take ENGRD 202 (Mechanics of Solids), as an engineering distribution course. The second engineering distribution may be selected according to their interests, and the following engineering distribution courses are recommended: ENGRD 201 Introduction to the Physics and Chemistry of the Earth, ENGRD 219 Mass and Energy Balances, ENGRD 221 Thermodynamics, ENGRD 250 Engineering Applications in Biological Systems, BIO G 101 and 103 Biological Sciences Lecture and Laboratory, BIO G 105 Introduction to Biology, BIO G 107 General Biology, or CHEM 389 Physical Chemistry.

Recommended engineering distribution courses for students planning to enter the civil engineering option are:

ENGRD 261, Introduction to Mechanical Properties of Materials, for students interested in structural engineering or civil engineering materials;

ENGRD 201, Introduction to the Physics and Chemistry of the Earth, for students interested in geotechnical engineering;

ENGRD 221, Thermodynamics, for students interested in fluid mechanics and hydraulics/hydrology;

ENGRD 211, Computers and Programming, for students interested in transportation;

ENGRD 241, Engineering Computation,* for all students.

Field Program:

Civil Engineering Option

For the field program in Civil Engineering, students may elect to substitute CHEM 208 for PHYS 214. The following nine courses are required in addition to those required for the Common Curriculum.

Core Courses	*Credits*
ENGRD 203, Dynamics	3
ENGRD 241, Engineering Computation*	3
CEE 304, Uncertainty Analysis in Engineering†	4
CEE 323, Engineering Economics and Management	3
CEE 331, Fluid Mechanics	4
CEE 341, Introduction to Geotechnical Engineering and Analysis	4
CEE 351, Environmental Quality Engineering**	3
CEE 361, Introduction to Transportation Engineering**	3
CEE 371, Modeling of Structural Systems	4

Additional requirements include a set of two field-approved electives and three design electives from an approved list of courses that is available in the school office. In addition, students must complete one technical communications course from among the courses designated ENGRC or approved communications courses. If the technical communications course is taken as an expressive art, then students must take an additional approved elective from a department or school other than Civil and Environmental Engineering.

*ENGRD 241 can be used to satisfy both the computer application requirement and a field program requirement. If a student elects to use this course as a second distribution course, the student must take an additional field-approved elective to fulfill the core course requirements.

†ENGRD 270 may be accepted (by petition) as a substitute for CEE 304 in the field program, but only if ENGRD 270 is taken before entry into the field, or in some special cases where co-op or study abroad programs necessitate such a substitution.

Students may substitute any Field-Approved Elective for either CEE 351 or CEE 361, **if** they complete either CEE 376 or CEE 372 and also complete CEE 473. However, this substitute course then counts as a Core Course only and not as one of the required five CEE Design courses and Field Approved electives.

Environmental Engineering Option

These option requirements apply to all students in the Classes of 2002 and later. For the field program in Environmental Engineering, students must take CHEM 208 in place of PHYS 214. The following nine courses are required in addition to those required for the Common Curriculum:

Core Courses	*Credits*
Introductory Biology‡ (BIO G 101 & 103, BIO G 105, or BIO G 107	4
ENGRD 241, Engineering Computation*	3
CEE 304, Uncertainty Analysis in Engineering†	4
CEE 323, Engineering Economics and Management	3
CEE 331, Fluid Mechanics	4
CEE 341, Introduction to Geotechnical Engineering and Analysis	4
CEE 351, Environmental Quality Engineering	3
CEE 451, Microbiology for Environmental Engineering§	3
CEE 453, Laboratory Research in Environmental Engineering	3
ABEN 475, Environmental Systems Analysis	3

Additional requirements include one‡ field-approved elective and three design electives from an approved list of courses that is available in the CEE Undergraduate Program office. In addition, students must complete one technical communications course from among the courses designated ENGRC or approved communications courses. If the technical communications course is taken as an expressive art, then students must take an additional approved elective.

‡The requirement for students prior to the class of 2002 is two field-approved electives and no requirement for a core course in introductory biology.

§Students planning graduate level study in environmental engineering may take BIOMI 290 Introduction to Microbiology in place of CEE 451. These students should also take CHEM 257 or CHEM 357 Introduction to Organic Chemistry as an approved elective.

Civil and Environmental Engineering Honors Program

Eligibility

The Bachelor of Science degree with honors will be granted to students who, in addition to having completed the requirements for a bachelor degree, have satisfactorily completed the honors program in Civil and Environmental Engineering and have been recommended for the degree by the faculty of the school. An honors program student must enter with and maintain a cumulative GPA≥ 3.5.

Content

A CEE honors program shall consist of at least nine credits beyond the minimum required for graduation in CEE. These nine credits shall be drawn from one or more of the following components:

1. A significant research experience or honors project under the direct supervision of a CEE faculty member using CEE 400: Senior Honors Thesis (1–6 credits per semester). A significant written report or senior honors thesis must be submitted as part of this component.

2. A significant teaching experience under the direct supervision of a faculty member or as part of a regularly recognized course in the College of Engineering (i.e., ENGRG 470: Peer Teaching in Engineering or CEE 401: Undergraduate Teaching in CEE (1–3 credits per/semester).
3. Advanced or graduate courses at the 500-level or above.

The minimum number of credits in any component included in a program should be two. No research, independent study, or teaching for which the student is paid may be counted toward the honors program.

Timing

All interested students must apply no later than the beginning of the first semester of their senior year, but are encouraged to apply as early as the first semester of their junior year. All honors program students must be in the program for at least two semesters prior to graduation.

Procedures

Each applicant to the CEE honors program must have a faculty adviser or faculty mentor to supervise the student's individual program. (This need not be the student's faculty adviser.) The application to the program shall be a letter from the student describing the specific proposed honors program and include the explicit approval of the faculty adviser and the honors adviser. Each program must be approved by the CEE Curriculum Committee, although the committee may delegate approval authority to the associate director for all but unusual proposals.

Engineering Minor Programs

The School of Civil and Environmental Engineering currently offers three engineering minor programs: civil infrastructure, engineering management, and environmental engineering (offered in cooperation with the Department of Agricultural and Biological Engineering). Descriptions and requirements for each program follow:

Minor in Civil Infrastructure

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the civil infrastructure minor: ABEN, A&EP, CHEME, COM S, EAS, ECE, M&AE, MS&E, OR&IE.

The minor in civil infrastructure is intended to introduce engineering undergraduates to the engineering methodologies of mechanics, materials, analysis, design, and construction and to show how these are used in solving problems in the development maintenance and operation of the built environment which is vital for any modern economy.

The requirements for the civil infrastructure minor are outlined below. For further details consult the Civil and Environmental Engineering Undergraduate Programs Office, 221 Hollister Hall.

Requirements

To complete the minor, the student must take at least six courses (minimum of 18 credits), chosen as follows:

I. Required Course: ENGRD 202 Mechanics of Solids

II. Additional Courses: choose any 5 (groupings are for information only)*

Geotechnical Engineering

CEE 341 Introduction to Geotechnical Engineering and Analysis

CEE 640 Foundation Engineering

CEE 641 Retaining Structures and Slopes

CEE 644 Environmental Applications of Geotechnical Engineering

Structural Engineering

CEE 371 Modeling of Structural Systems

CEE 372 Fundamentals of Structural Mechanics

CEE 376 Physical and Computational Material Simulation

CEE 473 Design of Concrete Structures

CEE 474 Design of Steel Structures

CEE 481 LRFD-Based Engineering of Wood Structures

CEE 672 Fundamentals of Structural Mechanics

CEE 673 Advanced Structural Analysis

Other Related Courses

CEE 332 Hydraulic Engineering

CEE 361 Introduction to Transportation Engineering

CEE 595 Construction Planning and Operations

*Other CEE courses approved by petition in advance.

Academic Standards: A letter grade of C or better for each course in the minor.

Minor in Engineering Management

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the engineering management minor: ABEN, A&EP, CHEME, COM S, EAS, ECE, M&AE, MS&E.

This minor focuses on giving engineering students a basic understanding of engineering economics, accounting, statistics, project management methods, and analysis tools necessary to manage technical operations and projects effectively. The minor provides an important set of collateral skills for students in any engineering discipline.

The requirements for the engineering management minor are outlined below. For further details, consult the Civil and Environmental Engineering Undergraduate Programs Offices, 221 Hollister Hall.

Requirements

To complete the minor, the student must take at least six courses (minimum of 18 credits), chosen as follows:

I. Required Courses (3):

CEE 304† Uncertainty Analysis in Engineering

or ENGRD 270 Basic Engineering Probability and Statistics

or ECE 310 Introduction to Probability and Random Signals

CEE 323 Engineering Economics and Management

OR&IE 350 Financial and Managerial Accounting

II. Additional Courses—choose any 3*

CEE 490 Management Practice in Project Engineering

CEE 506 Civil and Environmental Systems

CEE 593 Engineering Management Methods I: Data, Information, and Modeling

CEE 594 Engineering Management Methods II: Managing Uncertain Systems

CEE 595 Construction Planning and Operations

CEE 597 Risk Analysis and Management

CEE 598 Introduction to Decision Analysis

NBA 401 Entrepreneurship for Scientists and Engineers

or MAE/ENGRG 461 Entrepreneurship for Engineers

or ABEN 489 Engineering Entrepreneur ship, Management and Ethics

*Other courses approved by petition in advance.

†T&AM 310 may not be substituted for CEE 304.

Academic Standards: a letter grade of C or better for each course in the minor.

Minor in Environmental Engineering

(Offered in cooperation with the Department of Agricultural and Biological Engineering)

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the environmental engineering minor: A&EP, CHEME, COM S, EAS, ECE, M&AE, MS&E, OR&IE.

A fundamental challenge for the engineering profession is development of a sustainable society and environmentally responsible industry and agriculture reflecting an integration of economic and environmental objectives. We are called upon to be trustees and managers of our nation's resources, the air in our cities, and use and quality of water in our aquifers, streams, estuaries and coastal areas. This minor encourages engineering students to learn about the scientific, engineering, and economic foundations of environmental engineering so that they are better able to address environmental management issues.

The requirements for the environmental engineering minor are outlined below. For further details consult the Civil and Environmental Engineering Undergraduate Programs Office, 221 Hollister Hall, or the Agricultural and Biological Engineering Undergraduate Programs Office, 207 Riley-Robb Hall.

Requirements

To complete the minor, the student must take at least six courses (minimum of 18 credits), chosen as follows:

II. Students must select courses from the following group listings, with at least one course from each group.

Group A. Environmental Engineering Processes:

CEE 351 Environmental Quality Engineering

CEE 352 Water Supply Engineering

CEE 451 Microbiology for Environmental Engineering

CEE 453 Laboratory Research in Environmental Engineering

ABEN 476 Solid Waste Engineering

ABEN 478 Ecological Engineering

CEE 644 Environmental Applications of Geotechnical Engineering

ABEN 651 Bioremediation

CEE 653 Water Chemistry for Environ mental Engineering

CEE 655 Pollutant Transport and Transformation in the Environment

CEE 658 Sludge Treatment, Utilization and Disposal

CEE 654 Aquatic Chemistry

Group B. Environmental Systems:

ENGRI 113/CEE 113* Environmental Engineering for the Megalopolis (*May count only if taken before the student's junior year.)

ABEN 475 Environmental Systems Analysis

CEE 529 Water and Environmental Resources Problems and Policies

CEE 597 Risk Analysis and Management

CEE 623 Environmental Quality Systems Engineering

ABEN 678 Nonpoint Source Models

Group C. Hydraulics, Hydrology, and Environmental Fluid Mechanics:

CEE 331 Fluid Mechanics (CHEME 323 or M&AE 323 may be substituted for CEE 331)

CEE 332 Hydraulic Engineering

ABEN 371 Hydrology and the Environ ment

CEE 431/ABEN 471 Geohydrology

CEE 432 Hydrology

CEE 435 Coastal Engineering

CEE 436 Case Studies in Environmental Fluid Mechanics

CEE 437 Experimental Methods in Fluid Dynamics

ABEN 473 Watershed Engineering

ABEN 474 Drainage and Irrigation Systems

CEE 631 Flow and Contaminant Transport Modeling in Groundwater

CEE 633 Flow in Porous Media and Groundwater

CEE 655 Transport, Mixing, and Transformation in the Environment

ABEN 671 Analysis of the Flow of Water and Chemicals in Soils

ABEN 672 Drainage

Academic Standards: A letter grade of C- or better in each course in the minor and a cumulative GPA of 2.0 or better for all courses in the minor.

Master of Engineering (Civil) Degree Program

The M.Eng. (Civil) degree program is a 30-credit (usually 10-course) curriculum designed to prepare students for professional practice. There are two options in this program: one in civil and environmental engineering design and one in engineering management. Both options require a broad-based background in an engineering field. Applicants holding an ABET-accredited (or equivalent) undergraduate degree in engineering automatically satisfy this requirement. Those without such preparation will require course work beyond the graduate program's 30-credit minimum to fulfill the engineering preparation requirement. Both options also require one course in professional (design-option) or managerial (management-option) practice and a two-course project sequence. The project entails synthesis, analysis, decision making, and application of engineering judgment. Normally it is undertaken in cooperation with an outside practitioner, with some options indicating an intensive, full-time session between semesters. The general degree requirements and admissions information are described above in the section entitled "Master of Engineering Degree Programs." Each student's program of study is designed individually in consultation with an academic adviser and then submitted to the school's Professional Degree Committee for approval.

For the M.Eng. (Civil) program in civil and environmental engineering design options, the requirements are:

1) Three courses, one in professional engineering practice (CEE 590) and a two-course design project (CEE 501 and 502).
2) Specialization in a major concentration area—three to five courses in either environmental engineering, environmental fluid mechanics/hydrology, geotechnical engineering, structural engineering, transportation management, or water resources and environmental systems engineering.
3) Technical electives.
4) Study in a related area or areas.

Courses taken as technical electives or in the related subject area(s) may consist of graduate or advanced courses in fields related to the major concentration area, either inside or outside of the school.

For the M.Eng. (Civil) program in the engineering management option, the requirements are:

1) Five courses: Project Management (CEE 590), Engineering Management Methods (CEE 593 and 594), and the Management Project (CEE 591 and 592).
2) One course in finance, accounting, or engineering economics, as appropriate given a student's background.
3) One course in individual and/or organizational behavior from a recommended list.
4) Three courses from a disciplinary or functional specialization, subject to adviser's approval.

The School of Civil and Environmental Engineering cooperates with the the Johnson Graduate School of Management in two joint programs leading to both Master of Engineering and Master of Business Administration degrees. See the introductory section under College of Engineering for details.

COMPUTER SCIENCE

C. Van Loan, chair; B. Arms, G. Bailey, K. Birman, C. Cardie, T. Coleman, R. L. Constable, A. Demers, R. Elber, D. Fan, J. Gehrke, D. Greenberg, J. Halpern, J. E. Hopcroft, D. Huttenlocher, J. Kleinberg, D. Kozen, L. Lee, G. Morrisett, A. Myers, K. Pingali, F. B. Schneider, D. Schwartz, B. Selman, P. Seshadri, D. Shmoys, E. G. Sirer, E. Tardos, R. Teitelbaum, S. Vavasis, T. vonEicken, G. Yona, R. Zabih

Bachelor of Science Curriculum

The Department of Computer Science is affiliated with both the College of Arts and Sciences and the College of Engineering. Students in either college may major in computer science.

For the most current and accurate details, visit our web site at www.cs.cornell.edu/ugrad

The Major

Computer Science majors take courses in algorithms, data structures, logic, programming languages, scientific computing, systems, and theory. Electives in artificial intelligence, computer graphics, computer vision, databases, multimedia, and networks are also possible. Requirements include:

- four semesters of calculus (MATH 191–192–293–294 or 111–122 (or 112)–221–222)
- two semesters of introductory computer programming (COM S 100 and ENGRD 211)
- a one-credit project (COM S 212)
- a seven-course computer science core (COM S 280, 314, 321 or 322 or 421, 381, 414, and 482)
- two 400+ computer science electives, totaling at least six credits
- a computer science project course (COM S 413, 415, 418, 433, 473, 501, 514, 519, or 664)
- a mathematical elective course (OR&IE 270, MATH 300+, T&AM 310, etc.)
- two 300+ courses (field approved electives) that are technical in nature and total at least six credits
- a three-course specialization in a topic area other than computer science. These courses must be numbered 300-level or greater.

Note: All of the field electives described above must be courses of three or more credit hours, with the exception of the COM S project course, which may be two credits.

The program is broad and rigorous, but it is structured in a way that supports in-depth study of outside areas. Intelligent course selection can set the stage for graduate study and employment in any technical area and any professional area such as business, law, or

medicine. With the adviser, the computer science major is expected to put together a coherent program of study that supports career objectives and is true to the aims of liberal education.

Computer Science Honors Program

Eligibility

The Bachelor of Science degree *with honors* will be granted to students who, in addition to having completed the requirements for a bachelor degree, have:

- qualified for *latin* honors in the College of Engineering (basically, a cumulative GPA $\geq$ 3.5)
- at least eight credits of COM S course work at or above the 500-level (graded courses only; no seminars or two-credit project courses)
- at least six credits of COM S 490 (independent research) spread over two semesters, with a grade of A- or better each term.

See the COM S undergraduate web site for more information on eligibility: www.cs.cornell.edu/ugrad

Content

Honors courses may not be used to satisfy the COM S 400+ elective requirement, the COM S project requirement, the math or field approved electives, or the specialization.

Timing

Honors' determinations are made during the senior year. Students wanting to be considered for field honors should notify the Undergraduate Office in the Department of Computer Science via electronic mail at the following address: <ugrad@cs.cornell.edu>. The subject line for this message should read "HONORS TRACK." Related questions may be addressed to the ugrad e-mail alias, or candidates can call or stop by 303 Upson Hall, 255–0982.

Preparation

Arrangements for doing COM S 490 research should be made directly with faculty members in the department. Students are encouraged to discuss potential contacts with their advisers and/or browse the department's web page at www.cs.cornell.edu for specific leads on research opportunities.

The Department of Computer Science reserves the right to make changes to the honors program requirements at any time. Generally speaking, all members of the same graduating class in COM S will be subject to the same honors criteria.

Minor in Computer Science

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the Computer Science minor: ABEN, A&EP, CEE, CHEME, EAS, ECE, M&AE, MS&E, and OR&IE.

This minor is for students who anticipate that computer science will play a prominent role in their academic and professional career.

Requirements

To complete the minor, the student must take at least six (6) courses (18 credit minimum) chosen as follows:

I. Required Courses

COM S/ ENGRD 211	Computers and Programming
COM S 321	Numerical Methods in Computational Biology
or COM S/ ENGRD 322	Introduction to Scientific Computing
or COM S 421	Numerical Analysis
COM S/ECE 314	Introduction to Digital Systems and Computer Organization

II. Additional Courses

Three (3) COM S courses numbered 280 or higher (excluding seminars and practicums)

Academic Standards: A letter grade of C or better for each course in the minor.

Note: Computing courses offered by other departments cannot be applied toward the Computer Science minor, with the exception of ECE 314.

Master of Engineering (Computer Science) Degree Program

The M.Eng. program in computer science is a one-year program that can be started in either the fall or spring semester. This program is designed to develop expertise in system design and implementation in many areas of computer science, including computer networks, Internet architecture, fault-tolerant and secure systems, distributed and parallel computing, high performance computer architecture, databases and data mining, multimedia systems, computer vision, computational tools for finance, computational biology (including genomics), software engineering, programming environments, and artificial intelligence.

A typical program in computer science includes several upper-division and graduate courses and a faculty-supervised project. The course and project requirements are flexible and allow students to build up a program that closely matches their interests. In particular, slightly under half the courses may be taken outside the computer science department (for example, many students choose to take several business administration courses). Project work, which may be done individually or in a small group, can often be associated with ongoing research in the Department of Computer Science in one of the areas listed above.

Cornell seniors may use the early admission option to effectively co-register for the M.Eng. program while completing the undergraduate degree. This option can be started in either the fall or spring semester. It applies to students who have at least one credit and no more than eight credits remaining to complete their undergraduate program. All remaining undergraduate degree requirements must be satisfied by the end of the first semester the student is enrolled in the M.Eng. "early admit" program.

For more information about the M.Eng. program in computer science and the early admission option for Cornell seniors, please consult our web page at www.cs.cornell.edu/grad/meng.

Cooperative Program with the Johnson Graduate School of Management

Undergraduates majoring in computer science may be interested in a program that can lead, in the course of six years, to B.S., M.Eng. (Computer Science), and M.B.A. degrees. This program, which is sponsored jointly by the College of Engineering and the Johnson Graduate School of Management, enables students to study several subjects required for the M.B.A. degree as part of their undergraduate curriculum. Planning must begin early, however, if all requirements are to be completed on schedule.

For further details and assistance in planning a curriculum, students can consult with their adviser, the undergraduate office in 303 Upson Hall, or the Johnson School directly.

EARTH AND ATMOSPHERIC SCIENCES

(Formerly the Departments of Geological Sciences and part of Soil, Crop, and Atmospheric Sciences)

B. L. Isacks, chair; S. J. Riha, associate chair; Directors of Undergraduate Studies: K. H. Cook (Science of Earth Systems), R. W. Kay (Geological Sciences), and D. S. Wilks (Atmospheric Science); R. W. Allmendinger, W. D. Allmon, M. Barazangi, J. M. Bird, L. D. Brown, L. M. Cathles, J. L. Cisne, S. J. Colucci, A. T. DeGaetano, L. A. Derry, P. J. Gierasch, C. H. Greene, T. E. Jordan, S. Mahlburg Kay, M. C. Kelley, F. H. T. Rhodes, D. L. Turcotte, W. M. White, M. W. Wysocki

Bachelor of Science Curriculum

We live on a planet with finite resources and a finite capacity to recover quickly from human-induced environmental stresses. It is also a powerful planet, with geologic hazards such as earthquakes, hurricanes, and volcanic eruptions that alter the course of history with little prior warning. As the human population grows, understanding the earth and its resources becomes progressively more important for both future policymakers and ordinary citizens. Because the human need to understand the earth is so pervasive, we provide our students with three tracks covering the spectrum of modern earth sciences.

The Department of Earth and Atmospheric Sciences offers an undergraduate engineering program which permits students to pursue one of three options leading to a B.S. degree in geological sciences: the geoscience option, the atmospheric science option, and the science of earth systems (SES) option. The geoscience option emphasizes the structure, composition, and evolution of our planet; the atmospheric science option covers the planetary processes producing weather and climate; and the SES option is concerned with processes on and near the earth's surface where the interactions of water, life, rock, and air produce our planetary environment. An engineering minor is available in one or a combination of these programs.

Atmospheric Science Option

Atmospheric science is the study of the atmosphere and the processes that shape weather and climate. The curriculum

emphasizes the scientific study of the behavior of weather and climate, and applications to the important practical problems of weather forecasting and climate prediction. Students develop a fundamental understanding of atmospheric processes, and acquire skill and experience in the analysis, interpretation, and forecasting of meteorological events. The atmospheric science option satisfies both the curricular guidelines of the American Meteorological Society and the educational requirements of the National Weather Service for employment as a meteorologist, which also qualifies graduates for positions in private-sector forecasting and environmental consulting firms. The option also provides excellent preparation for graduate work in atmospheric science and related fields.

Students following the atmospheric science option are required to take ENGRD 270 as the engineering distribution course. The field program includes required introductory courses in atmospheric science (EAS 131) and EAS 250 (Instrumentation and Observations). Many of the upper division field courses require EAS 341 (Atmospheric Thermodynamics and Hydrostatics) and EAS 342 (Atmospheric Dynamics) as prerequisites, which are normally taken in the junior year. The additional required field program courses are EAS 331 (Climate Dynamics), EAS 352 (Synoptic Meteorology I), EAS 451 (Synoptic Meteorology II), EAS 435 (Statistical Methods in Meteorology), and EAS 447 (Physical Meteorology). Field-approved electives may be chosen from other EAS courses or from selected upper-division courses offered in other departments.

Geoscience Option

The geoscience option reveals Earth's turbulent history from the formation of our solar system to the plate tectonic cycles that dominate Earth's present behavior. That history is highlighted by the co-evolution of life and the Earth system—from the origin of life to the modern inter-glacial phase during which our species has so proliferated. Topics of study also include the fundamental processes responsible for earthquakes, volcanic eruptions, and mountain building. The geoscience option prepares students for advanced study in geology, geophysics, geochemistry, and geobiology, and careers in mineral and petroleum exploration or in environmental geology. Alternatively, it is a valuable major for a pre-law or pre-med program or in preparation for a career in K–12 education.

The geoscience option stresses a balanced overview of geology with considerable flexibility and a degree of specialization achieved by careful selection of field-approved electives. Students are required to take ENGRD/EAS 201 as an engineering distribution course. For students interested in geobiology or paleontology, BIO G 101/103–102/104 (or BIO G 109–110) are recommended. CHEM 208 may be substituted for PHYS 214.

The geoscience option requires the following courses: the introductory outdoor field course; EAS 210, and the five core courses, EAS 326, 355, 356, 375, and 388. Two additional EAS field-required courses and at least one field-approved elective must be EAS 300 through 600-level courses. The core courses may be taken in any reasonable sequence, except that EAS 355, which is offered in the fall, should be taken before EAS 356, which is offered in the spring. EAS 326, 355, 356, and 375 should be taken relatively early in the major program.

In addition, a requirement for an advanced outdoor field experience may be met by completing one of the following four-credit options: (a) EAS 417 (Field Mapping in Argentina, 3 credits) and EAS 491–492 (based on field observations) for a combined four-credit minimum; (b) EAS 437 (Geophysical Field Methods, 3 credits) plus at least one credit of EAS 491 or 492 using geophysical techniques from EAS 434; (c) EAS 491–492 (Undergraduate Research, two credits each) with a significant component of field work; or (d) an approved outdoor field course taught by another college or university (four-credit minimum).

A selection of field-approved electives may provide specializations in geophysics, geochemistry (including petrology and mineralogy), geobiology (paleontology), and geology applied to mineral and petroleum industries, environmental problems, hydrology, and civil engineering. Students intending to specialize in economic geology or pursue careers in the mining industries or mineral exploration should consider including economics courses among their liberal studies distribution courses. Students who want a more general background or want to remain uncommitted with regard to specialty must choose at least two of their field-approved electives from the same field. The field-approved electives outside the field may be chosen from offerings in other science or engineering fields or the liberal arts, but should be at the 300-level or above. Students may request substitution of EAS 491 and 492, Undergraduate Research, for a fourth-year field-approved elective but not if it is being used to fulfill the outdoor field requirement.

In addition to course work, students learn by involvement in research projects. Facilities include equipment for processing seismic signals and digital images of the earth's surface, instruments for highly precise isotope and element analyses, and extensive libraries of earthquake records, satellite images, and exploration seismic records. High-pressure, high-temperature mineral physics research uses the diamond anvil cell and the Cornell High Energy Synchrotron Source (CHESS). Undergraduates have served as field assistants for faculty members and graduate students in Argentina, British Columbia, the Aleutian Islands, Scotland, Switzerland, Tibet, and Barbados. Undergraduates are encouraged to participate in research activities, frequently as paid assistants.

Science of Earth Systems (SES) Option

The science of earth systems (SES) option provides an integrated view of Earth processes critical to the understanding of our environment. This scientific understanding is the primary foundation used to determine to what degree human societies can modify or adapt to future change. The SES option is for students interested in careers and/or graduate study in any of the earth system sciences or a future in environmental law, environmental engineering, science teaching, or environmental public policy. The SES option enables students in the College of Engineering to take part in the multi-disciplinary, intercollege program in the Science of Earth Systems. Collaborations with other departments provide breadth and depth to the program.

The SES option emphasizes a strong preparation in basic mathematics and sciences and an integrated approach to the study of the Earth system including the lithosphere, biosphere, hydrosphere, and atmosphere.

Students are required to take a second semester of chemistry, two semesters of introductory biology, and ENGRD 201 (Physics and Chemistry of the Earth) as one of the engineering distribution courses. The option requires a set of three core courses, normally taken in the junior or senior years, which provide breadth and integration. An additional set of five intermediate to advanced courses are selected to provide depth and a degree of specialization. These courses permit the student to specialize in such areas as climate dynamics, biogeochemistry, ocean sciences, environmental geosciences, ecological systems, hydrological sciences, and soil sciences.

The field requirements for the SES option are summarized as follows. CHEM 208 and ENGRD 201/EAS 201 are required. The field program includes BIO G 101/103–102/104 (or BIO G 109–110), BIOES 261, the three SES core courses listed below, five additional courses selected with the adviser's approval to provide specialization in one or a combination of the areas covered by SES, and an additional field-approved elective. Two of the specialization courses will count as field-required courses, and three as field-approved electives. At least three of the field-approved electives must be non-EAS courses. The three SES core courses are:

EAS 302 Evolution of the Earth System—Spring. 4 credits

EAS 321 Biogeochemistry (also NTRES 321)—Fall. 4 credits

EAS 331 Climate Dynamics (also ASTRO 331)—Fall. 4 credits

Areas of specialization include (but are not limited to) the following:

- Biogeochemistry
- Climate dynamics
- Ecological systems
- Environmental biophysics
- Environmental geology
- Hydrological sciences
- Soil science
- Ocean sciences

In addition to faculty in or associated with the Department of Earth and Atmospheric Sciences, faculty currently associated with the SES program include the following:
W. Brutsaert (CEE); L. Hedin (EEB);
R. Howarth (EEB, EAS); J.-Y. Parlange (ABEN);
J. Yavitt (NTRES).

Earth and Atmospheric Science Honors Program

Eligibility

The Bachelor of Science degree (in geological sciences) with honors will be granted to students who, in addition to having completed the requirements for a bachelor's degree, have satisfactorily completed the honors program in Earth and Atmospheric Sciences and have been recommended for the degree by the honors committee of the department. An honors program student must enter with and maintain a cumulative GPA ≥ 3.5.

Content

In addition to the minimum requirements, a student must

1. take at least nine credits above the minimum required for graduating and approved by the upperclass adviser;
2. have a written proposal of the honors project accepted by his or her faculty adviser and the director of undergraduate studies;
3. complete an honors thesis involving research (EAS 491–492 or 499, two or more credits each) of breadth, depth, and quality.

Timing

A student interested in completing an honors thesis must, by the beginning of the seventh semester, have a written proposal of the honors project accepted by the student's adviser and the director of undergraduate studies.

Procedures

Each applicant to the Earth and Atmospheric Sciences honors program must have a faculty adviser to supervise the honors thesis research. Written approval by the faculty member who will direct the research is required. After the college verifies the student's grade-point average, the student will be officially enrolled in the honors program.

Minor in Geological Sciences

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the Geological Sciences minor: ABEN, A&EP, CEE, CHEME, COM S, ECE, M&AE, MS&E, OR&IE.

Whereas many engineering students will encounter and have to understand the natural operating systems of Earth in their professions, the tools and techniques used by earth scientists to understand these solid and fluid systems over the widest scales of space and time are of use to a wide cross-section of engineering students. This minor is designed to give a flexible set of options for students looking to complement training in their major field with a core education in Geological Sciences.

The requirements for the Geological Sciences minor are outlined below. For further details consult the Undergraduate Programs Office, 2122 Snee Hall, or www.eas.cornell.edu.

Requirements

To complete the minor, the student must take at least six courses (minimum of 18 credits), chosen as follows:

I. Choose one or two of these three courses:

ENGRD 201 Introduction to the Physics and Chemistry of the Earth

EAS 210 Introduction to Field Methods in Geological Sciences

EAS 203 Natural Hazards and the Science of Complexity

II. Choose at least two courses from the following list of core courses:

EAS 302 Evolution of the Earth System

EAS 321 Introduction to Biogeochemistry

EAS 326 Structural Geology

EAS 355 Mineralogy

EAS 356 Petrology and Geochemistry

EAS 375 Sedimentology and Stratigraphy

EAS 388 Geophysics and Geotectonics

III. To complete the minor, these three to four courses are to be supplemented with two to three additional EAS courses at the 300-level or higher. These may include, for example, additional courses from the above list of core courses, undergraduate research courses, and outdoor field courses.

Academic Standards: A letter grade of C- or better for each course in the minor and a cumulative GPA of 2.0 or better for all courses in the minor.

ELECTRICAL AND COMPUTER ENGINEERING

C. R. Pollock, director; J. M. Ballantyne, T. Berger, A. W. Bojanczyk, M. Burtscher, H.-D. Chiang, D. F. Delchamps, L. F. Eastman, D. T. Farley, T. L. Fine, Z. Haas, D. A. Hammer, M. Heinrich, S. S. Hemami, C. R. Johnson, Jr., E. Kan, M. C. Kelley, P. M. Kintner, R. Kline, K. T. Kornegay, J. P. Krusius, R. Manohar, B. A. Minch, T. W. Parks, A. Phillips Jr., C. R. Pollock, A. P. Reeves, C. E. Seyler, Jr., J. R. Shealy, E. Speight, M. G. Spencer, C. L. Tang, R. J. Thomas, N. Tien, S. Tiwari, L. Tong, V. Veeravalli, S. B. Wicker

Bachelor of Science Curriculum

The Department of Electrical and Computer Engineering offers an undergraduate field program which leads to a B.S. degree in electrical engineering. The curriculum provides a foundation which reflects the broad scope of this engineering discipline.

Concentrations include computer engineering and digital systems; control systems; electronic circuit design; information, communication, and decision theory; microwave electronics; plasma physics; power and energy systems; quantum and optical electronics; radio and atmospheric and space physics; and semiconductor devices and applications.

Electrical and Computer Engineering Field Program

Students planning to enter the field program in Electrical and Computer Engineering must take ENGRD 231 as an engineering distribution course. The fall of the sophomore year is the preferred term for ENGRD 231/ECE 232 for students without advanced standing in mathematics. Electrical and Computer Engineering students with an interest in computer engineering are encouraged to take ENGRD 211 as an engineering distribution course prior to entry into the field program. In addition, the field program normally begins in the spring of the sophomore year, as shown below. All of these courses (except ECE 210 and ENGRD 231) are taught only once each academic year, either spring or fall, as indicated in the course descriptions.

Course	Credits
Field Required Courses	
ECE 210, Introduction to Circuits for Electrical and Computer Engineers	3
ECE 215, Introductory Integrated Circuits Laboratory	1
ECE 232, Digital Systems Design Laboratory	1
ECE 301, Signals and Systems I	4
ECE 303, Electromagnetic Fields and Waves	4
ECE 314, Computer Organization	4
ECE 315, Electronic Circuit Design	4
Field Approved Electives (32-credit minimum in the following categories)	
Advanced Electrical and Computer Engineering Electives† (7 courses)	20 minimum
Outside ECE Electives‡ (3 courses)	9 minimum
Total minimum field credits	53

ECE 310 can be taken in place of ENGRD 270 or T&AM 310 to satisfy the college application of probability and statistics requirement.

†These electives must include two 400-level electrical and computer engineering laboratory courses and at least two additional courses at the 400-level or above. The remaining electives may not include independent project courses, such as ECE 391, 392, 491, or 492, and must be at the 300-level or above in Electrical and Computer Engineering.

Courses that meet the laboratory requirement are described in the online ECE Handbook. (The list is dynamic and changes frequently. Always refer to the latest information on the ECE Web Handbook.) All courses must have a college-level prerequisite.

‡Must include one course at the 300-level or above (see *Electrical and Computer Engineering Web Handbook* for details).

All students graduating with a B.S. degree must fulfill the engineering design requirement and the college technical requirement. To meet this requirement, students must demonstrate that they have completed courses that contain at least 16 credits of engineering design. A table listing the engineering design content of all relevant electrical and computer engineering and computer science courses is available through the department web handbook pages at www.ece.cornell.edu/. The technical writing requirement is discussed in the College of Engineering section of this book.

Undergraduate specialization is achieved through the various electrical and computer engineering elective courses, as well as other courses in related technical fields within engineering, mathematics, the physical sciences, and the analytical biological sciences. The School of Electrical and Computer Engineering offers more than 30 courses that are commonly taken as electives by undergraduates.

An electrical and computer engineering honors program also exists for those students who so desire and meet the program entrance requirements. The honors program requires an additional senior ECE course; a required senior year directed reading course, or a design project, or ENGRG 470; and completion of the honors seminar in the junior year. Details are available via the electrical and computer engineering homepage located through the web at www.ece.cornell.edu/UgradHandbook/honors.html.

All students majoring in electrical and computer engineering are expected to meet the following academic standards:

1. Students must achieve a grade-point average of at least 2.3 every semester.
2. No course with a grade of less than C– may be used to satisfy degree requirements in the field program or serve as a prerequisite for a subsequent electrical and computer engineering course.
3. Students must complete satisfactorily ECE 210, ECE 215, MATH 294, and PHYS 214 by the end of the sophomore year in the field program of Electrical Engineering, and make adequate progress toward the degree in subsequent semesters.
4. Honors program students must meet the GPA and progress requirements specified in the *Electrical and Computer Engineering Web Handbook* and the college handbook to remain active participants.

Electrical and Computer Engineering Honors Program

Eligibility, Entry, and Continuation

A student must apply to enter the ECE Honors Program and may do so as early as the beginning of the fifth semester or as late as the end of the sixth semester. A student must have a cumulative GPA of at least 3.5 to apply for entry. A student in the honors program whose cumulative GPA falls below 3.5 at the end of any semester will be dropped from the honors program by College of Engineering regulations. There is an additional requirement (see Honors Seminar) for entry into the program after the end of the fifth semester.

Honors Seminar

Any student in the honors program is required to take (or to have taken) an honors seminar during his or her junior year. The Honors Seminar is a two-credit semester-course (offered spring only) consisting of a weekly series of introductory research lectures by Electrical and Computer Engineering faculty members. Each honors seminar enrollee will be required to write a number of short papers on topics covered in the lecture series. Many Electrical and Computer Engineering faculty members will give a lecture or short series of lectures as part of the Honors Seminar. Students in the honors program and students with a cumulative GPA of at least 3.5 who are considering entering the honors program must receive letter grades for the Honors Seminar.

Honors Project

Any student in the honors program is required to accumulate at least three credit hours from a senior year honors project consisting either of design, ENGRG 470, or directed reading. All honors projects emphasize the development of communication skills. Design- and reading-oriented honors projects require explicitly a written submission summarizing and concluding the project.

Additional Coursework

Any student in the honors program is required to take at least three credit hours of advanced (senior level) ECE coursework that has at least a 300-level prerequisite. These credit hours are in addition to any credit hours required as part of the ECE field program.

The program described above requires honors program participants to amass at least nine credit hours over and above the 128 credit hours required for a B.S. degree; thus an honors degree requires a minimum of 137 credit hours.

Minor in Electrical and Computer Engineering

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the Electrical and Computer Engineering minor: ABEN, A&EP, CEE, CHEME, COM S, EAS, M&AE, MS&E*, OR&IE. (*MS&E students planning to pursue this minor must receive prior written approval from both MS&E and ECE, via petition.)

The School of Electrical and Computer Engineering offers a minor to students who wish to complement their major field by obtaining a background in electrical and computer engineering. The minor offers the opportunity to study analog and digital circuits, signals and systems, electromagnetic fields, and additionally specialize at higher levels in one of several different areas such as circuit design, electronic devices, communications, computer engineering, networks, or space engineering.

The requirements for the Electrical and Computer Engineering minor are outlined below. For further details consult the Electrical and Computer Engineering Undergraduate Programs Office, 222 Phillips Hall.

Requirements

To complete the minor, the student must take at least six courses (minimum of 18 credits), chosen as follows:

I. Required Courses:

ECE 210 Introduction to Circuits for Electrical and Computer Engineers

and ECE 215 Introductory Integrated Circuits Laboratory (ECE 210 and 215 count as one course)

ENGRD 231 Introduction to Digital Systems

and ECE 232 Digital Systems Design Laboratory (ENGRD 231 and 232 count as one course)

II. Two of the following:

ECE 301 Signals and Systems I

ECE 303 Electromagnetic Fields and Waves

ECE 315 Electronic Circuit Design

III. One other ECE course at the 300 level or above (3 credit minimum)

IV. One other ECE course at the 400 level or above (3 credit minimum)

Academic Standards: A letter grade of C- or better for each course to be counted in the minor and a cumulative GPA of 2.3 or better for all courses in the minor.

Master of Engineering (Electrical) Degree Program

The M.Eng. (Electrical) degree program prepares students either for professional work in electrical engineering and closely related areas or for further graduate study in a doctoral program. The M.Eng. degree differs from the Master of Science degree mainly in its emphasis on professional skills, engineering design, and analysis skills rather than basic research.

The program requires 30 credits of advanced technical course work beyond that expected in a typical undergraduate program, including a minimum of four courses in electrical and computer engineering. An electrical and computer engineering design project is also required and may account for three to eight credits of the M.Eng. program. Occasionally, students take part in very extensive projects and may apply for a waiver of the eight-credit maximum and increase the project component to 10 credits. Students with special career goals, such as engineering management, may apply to use up to 11 credits of approved courses that have significant technical content, but are taught in disciplines other than engineering, mathematics, or the physical sciences.

Cornell undergraduate students with advanced standing frequently take one or more graduate-level courses prior to graduation and may actually begin accumulating credit toward the Master of Electrical and Computer Engineering program in their last semester of undergraduate work. Application of credits taken while an undergraduate at Cornell must be approved in advance of the last semester of undergraduate work.

Although admission to the M.Eng. (Electrical) program is highly competitive, all well-qualified students are urged to apply. Further information is available from the Master of Electrical and Computer Engineering Program web site at www.ece.cornell.edu/MENG/index.html.

MATERIALS SCIENCE AND ENGINEERING

C. K. Ober, director, D. G. Ast, S. P. Baker, J. M Blakely, R. Dieckmann, E. P. Giannelis, D. T. Grubb, G. G. Malliaras, A. L. Ruoff, S. L. Sass, Y. Suzuki, M. O. Thompson, U. B. Wiesner

Bachelor of Science Curriculum

Students majoring in materials science and engineering are required to take ENGRD 261, Introduction to Mechanical Properties of Materials, before affiliating with the field. It is strongly recommended that this course be taken as an engineering distribution during the sophomore year. The field program develops a comprehensive understanding of the physics and chemistry underlying the unique properties of modern engineering materials and processes.

In the field, students are required to complete a series of electives to develop both breadth and specialization in sub-areas of the field including, for example, solid state, metallic materials, ceramic materials, polymeric materials, electronic materials, biomaterials, or computational materials science. These requirements are satisfied through a series of technical electives in the junior and senior years, selected from multiple engineering and science departments. Optional research involvement courses provide undergraduates with the opportunity to work with faculty members and their research groups on current projects.

The requirements for a Bachelor of Science degree in materials science and engineering are:

1. Completion of the common engineering curriculum including liberal studies electives
2. ENGRD 261, Introduction to Mechanical Properties of Materials
3. Completion of 12 required field courses:

   ENGRD 202 Mechanics of Solids

   MS&E 204 Materials Chemistry

   MS&E 206 Atomic and Molecular Structure of Matter

   MS&E 302 Mechanical Properties of Materials, Processing, and Design

   MS&E 303 Thermodynamics of Condensed Systems

   MS&E 304 Kinetics, Diffusion, and Phase Transformations

   MS&E 305 Electronic Structure of Matter

   MS&E 306 Electronic, Optical and Magnetic Properties of Materials

   MS&E 307 Materials Design Concepts I

   MS&E 403/405 Senior Materials Lab I or Senior Thesis I

   MS&E 404/406 Senior Materials Lab II or Senior Thesis II

   MS&E 407 Materials Design Concepts II
4. Depth in one specialization developed through three technical electives
5. Breadth developed through two technical electives in different specialization areas
6. One of the depth or breadth electives must be taken from outside MS&E
7. One additional outside technical elective

To continue in good standing in the Field of Materials Science and Engineering, students must

1. Maintain a 2.0 term average for all semesters.
2. Maintain an average of 2.3, with no grade below C, in the department's core curriculum.
3. Complete ENGRD 261 with a minimum of C prior to affiliation.

The department's core curriculum consists of ENGRD 261, the 12 required field courses, and the five technical electives constituting the depth and breadth requirements.

An attractive and very challenging program combines the materials science and engineering curriculum with that of either electrical engineering or mechanical engineering, leading to a double major. Curricula leading to the double-major degree must be approved by both of the departments involved and students are urged to plan such curricula as early as possible to avoid scheduling conflicts.

Materials Science and Engineering Honors Program

Eligibility

The Bachelor of Science degree with honors will be granted to students who, in addition to having completed the requirements for a bachelor degree, have satisfactorily completed the honors program in materials science and engineering and have been recommended for the degree by the honors committee of the department. An honors program student must enter with, and maintain, a cumulative GPA above 3.5.

Content

The requirements for an honors degree in materials science and engineering are:

1. Students must complete at least nine credits beyond the minimum required for graduation in materials science and engineering. This increases the minimum number of credits for graduation with honors to 137. These additional courses must be technical in nature, i.e., in engineering, mathematics, chemistry, and physics at the 400- and graduate-level, with selected courses at the 300-level. All courses satisfying this requirement must be approved by the upper class adviser.
2. Senior honors thesis (MS&E 405/406) with a grade of at least A.

Note: Undergraduates typically enter the honors program at the beginning of their senior year (seventh semester) and thus must have a cumulative GPA equal to or greater than 3.5 at that point.

Timing

All interested students must complete a written application no later than the end of the third week of the first semester of their senior year, but are encouraged to make arrangements with a faculty member to work on a senior honors thesis during the second semester of their junior year. A student must be in the program for at least two semesters prior to graduation.

Procedures

Each application to the materials science and engineering honors program must have a faculty adviser to supervise the honors program. Written approval of the faculty member who will direct the research is required. After the student's grade-point average is verified, the student will be officially enrolled in the honors program.

Minor in Materials Science and Engineering

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the materials science and engineering minor: ABEN, A&EP, CEE, CHEME, COM S, EAS, ECE, M&AE, OR&IE.

Material properties are the foundation of many engineering disciplines including mechanical, civil, chemical, and electrical engineering. This minor provides engineers in related fields with a fundamental understanding of mechanisms that determine the ultimate performance, properties, and processing characteristics of modern materials.

The requirements for the materials science and engineering minor are outlined below. For further details, consult the Materials Science and Engineering Undergraduate Program Office, 210 Bard Hall.

Requirements

To complete the minor, students must take at least six courses (minimum of 18 credits), chosen as follows:

1. ENGRD 261 Introduction to Mechanical Properties of Materials
2. Two of:

   MS&E 204 Materials Chemistry

   MS&E 206 Atomic and Molecular Structure of Matter

   MS&E 302 Mechanical Properties of Materials, Processing, and Design

   MS&E 303 Thermodynamics of Condensed Systems

   MS&E 304 Kinetics, Diffusion, and Phase Transformations

   MS&E 305 Electronic Structure of Matter

   MS&E 306 Electronic, Optical, and Magnetic Properties of Materials
3. Three electives chosen from:

Any MS&E course at the 300-level or above

Selected courses in materials properties and processing (at the 300-level or above) from A&EP, CHEME, CEE, ECE, M&AE, PHYS, and CHEM, as approved by the MS&E undergraduate coordinator.

Academic Standards: A letter grade of C or better for each course in the minor.

Master of Engineering (Materials) Degree Program

Students who have completed a four-year undergraduate program in engineering or the physical sciences can be considered for admission into the M.Eng. (Materials) program. This program consists of 30 credits, including course work and a master's design project. The project, which requires individual effort and initiative, is carried out under the supervision of a faculty member. Twelve credits are devoted to the project, which is normally experimental in nature, although computational or theoretical projects are also possible.

Courses for the additional 18 credits are selected from the graduate-level classes in materials science and engineering and from other related engineering fields approved by the faculty. Typically half of the courses are from MS&E. One three-credit technical elective must include advanced mathematics (modeling, computer application, or computer modeling), beyond the MS&E undergraduate requirements.

MECHANICAL AND AEROSPACE ENGINEERING

S. Leibovich, director; P. L. Auer, C. T. Avedisian, D. L. Bartel, J. F. Booker, J. R. Callister, M. E. Campbell, D. A. Caughey, R. D'Andrea, P. R. Dawson, P. C. T. deBoer, E. M. Fisher, A. R. George, F. C. Gouldin, C. Hui, M. Y. Louge, J. L. Lumley, M. P. Miller, F. C. Moon, F. K. Moore, S. Mukherjee, R. M. Phelan, S. L. Phoenix, S. B. Pope, M. L. Psiaki, E. L. Resler, Jr., A. Ruina, W. Sachse, S.E. Shen, K. E. Torrance, F. Valero-Cuevas, M. C. H. van der Meulen, H. B. Voelcker, K. K. Wang, Z. Warhaft, C. H. K. Williamson, N. Zabaras, A. Zehnder

Members of the faculty of the graduate Fields of Aerospace Engineering and Mechanical Engineering are listed in the *Announcement of the Graduate School*.

Bachelor of Science Curriculum in Mechanical Engineering

The upperclass field program in Mechanical Engineering is designed to provide a broad background in the fundamentals of this discipline as well as to offer an introduction to the many professional and technical areas with which mechanical engineers are concerned. The program covers both major streams of the field of mechanical engineering.

Mechanical systems, design, and materials processing is concerned with the design, analysis, testing, and manufacture of machinery, vehicles, devices, and systems. Particular areas of concentration are mechanical design and analysis, vehicle engineering, biomechanics, and materials processing and precision engineering. Other topics covered are computer-aided design, vibrations, control systems, and dynamics.

Engineering of fluids, energy, and heat-transfer systems is concerned with the efficient conversion of energy in electric power generation and aerospace and surface transportation, the environmental impact of engineering activity (including pollutants and noise), aeronautics, and with the experimental and theoretical aspects of fluid flow, heat transfer, thermodynamics, and combustion. Specific areas of concentration include aerospace engineering; heat, energy, and power engineering; and thermo-fluid sciences.

The undergraduate program is a coordinated sequence of courses beginning in the sophomore year. During the fall term sophomore students who plan to enter the Mechanical Engineering program take ENGRD 202 (also T&AM 202) as an engineering distribution course. They also are encouraged to take ENGRD 221 (also M&AE 221), which is a field requirement that may simultaneously satisfy Common Curriculum requirements as an engineering distribution course. Occasionally because of study abroad or requirements for second majors or pre-med, students cannot complete all of the required sophomore courses on schedule. In such cases students should delay ENGRD 221 until the first semester of the junior year. The Sibley School supports students with unusual requirements, but any delays or substitutions must be discussed with and receive approval from the student's adviser.

The course requirements for the degree of Bachelor of Science in Mechanical Engineering are as follows:

1. Completion of the Common Curriculum. During the upperclass years this will typically mean earning credit for five humanities or social science courses.
2. Completion of the field requirements, which consist of eleven required courses (beyond ENGRD 202 already mentioned), and five field approved elective courses.

The eleven required courses are:

M&AE 212, Mechanical Properties and Processing of Engineering Materials

M&AE 221, Thermodynamics

M&AE 225, Mechanical Design and Synthesis

T&AM 203, Dynamics

ECE 210, Introduction to Circuits for Electrical and Computer Engineers

M&AE 323, Introductory Fluid Mechanics

M&AE 324, Heat Transfer

M&AE 325, Mechanical Design and Analysis

M&AE 326, System Dynamics

M&AE 427, Fluids/Heat Transfer Laboratory

M&AE 428, Engineering Design

Electives

Students should use the flexibility provided by the field approved electives, approved electives, and humanities/social sciences electives to develop a program to meet their specific goals.

Field Approved Electives

The upper-level program includes five field approved electives. Using these five courses, the student must satisfy the following requirements.

At least three of the courses must be upper-level (300+) M&AE courses. Of these three, two must satisfy a concentration chosen by the student. Typically these are two courses chosen from an appropriate subset of the school's upper-class offering. However, students may petition for approval of two related courses to form a custom concentration.

The standard concentrations are:

Fluids/Aerospace Engineering, M&AE 305, 306, 423, 506, 507

Thermal Systems Engineering, M&AE 423, 449, 453, 506, 543

Materials Processing, M&AE 412, 514

Mechanical Systems, M&AE 412, 417, 470, 478, 479, 525, 565

Vehicle Engineering, M&AE, 306, 386, 425, 426, 440, 441, 449, 486, 506, 507

Biomechanics, M&AE 463, 464, 565

Of the three upper-level M&AE courses, one must be an approved design elective. The design offerings may change from year to year.

Typically this list includes M&AE 401, 412, 426, 441, 470, 479, 486, 491 and 525.

Note that the design elective must be taken during the senior year. Note that a single course may satisfy both the design and concentration requirements, in which case the third course could be any upper level M&AE course.

One of the courses must be an approved upper-level mathematics course taken after MATH 294. The course must include some material on statistics. Currently, the approved courses are T&AM 310 and OR&IE 270.

One of the field approved electives can be viewed as a technical elective and may be any course at an appropriate level, chosen from engineering, mathematics, or science (physics, chemistry, or biological sciences). Appropriate level is interpreted as being at a level beyond the required courses of the college curriculum. Note that courses in economics, business, and organizational behavior are not accepted. Advisers may approve such courses as approved electives.

Approved Electives

To maximize flexibility (i.e., the option for study abroad, COOP, internships, pre-med, and flexibility during the upper-class years), the Sibley School faculty recommends that students delay use of approved electives until after term three. The faculty encourages students to consider the following as possible approved electives:

any engineering distribution course

courses stressing oral or written communications

courses stressing the history of technology

rigorous courses in the physical sciences (physics, biology, chemistry)

courses in informational science (mathematics, computer science)

courses in methodologies (modeling, problem solving, synthesis, design)

courses in technology (equipment, machinery, instruments, devices, processes)

courses in business enterprise operations (economics, financial, legal, etc.)

courses in organizational behavior

courses in cognitive sciences.

The faculty recommendation on humanities/social sciences electives is that students build a program that includes studies in:

history of technology

societal impacts of technology

history

foreign languages

ethics

communications

political science

aesthetics

economics

architecture

An additional graduation requirement of the field program is proof of elementary competence in technical drawing. The demonstration of competence is expected before completion of M&AE 325, Mechanical Design and Analysis. This proof may be given in a number of ways, including satisfactory completion of

a. a technical drawing course in high school or in a community college,
b. ENGRG 102, Drawing and Engineering Design,
c. another technical drawing course at Cornell, or
d. a departmental examination.

The computer applications requirement of the Common Curriculum may be satisfied by several courses, including M&AE 470 and M&AE 479.

The technical writing requirement of the Common Curriculum is satisfied by M&AE 427.

Introduction to Circuits for Electrical and Computer Engineers (ECE 210) may be replaced or supplemented by Electronic Circuits (PHYS 360).

A limited set of third-year courses is offered each summer under the auspices of the Engineering Cooperative Program.

More detailed materials describing the Mechanical Engineering Program can be obtained from the Sibley School of Mechanical and Aerospace Engineering, Upson Hall.

Minor in Mechanical Engineering

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the mechanical engineering minor: ABEN, A&EP, CHEME, CEE, COM S, EAS, ECE, MS&E, OR&IE.

Requirements

To complete the minor, the student must choose at least six courses (minimum of 18 credits) from among the following: M&AE courses at the 200-level or above; ENGRD 202, Mechanics of Solids; ENGRD 203, Dynamics.

Rules for selecting courses:

(1) The selection of courses must satisfy the following three requirements.

a) At least two courses must be numbered above 300.

b) At least one course must be either (1) numbered above 500 or (2) numbered above 326 and have as its prerequisite ENGRD 202, ENGRD 203, or an M&AE course.

c) Each course must be worth at least three credits.

(2) Substitutions of courses other than M&AE (or ENGRD 202 and 203) will not be accepted as part of the M&AE minor. However, some instructors of M&AE courses will accept non-M&AE courses as substitute prerequisites for their courses, or may choose to waive prerequisites in some circumstances. Students should check with the course instructor.

Academic Standards: A letter grade of C- or better for each course in the minor.

Examples of typical minor programs are as follows:

Typical focus in Fluids/Thermal Systems:

The following four courses:

ENGRD 202 Mechanics of Solids

ENGRD 203 Dynamics

ENGRD 221 Thermodynamics

M&AE 323 Introductory Fluid Mechanics

Plus two of the following, of which at least one course must satisfy requirement 1b:

M&AE 305 Introduction to Aeronautics

M&AE 324 Heat Transfer

M&AE 423 Intermediate Fluid Dynamics

M&AE 427 Fluids/Heat Transfer Laboratory

M&AE 449 Combustion Engines

M&AE 490 Special Investigations in Mechanical and Aerospace Engineering

M&AE 491 Design Projects in Mechanical and Aerospace Engineering

M&AE 506 Aerospace Propulsion Systems

M&AE 507 Dynamics of Flight Vehicles

M&AE 543 Combustion Processes

Typical focus in Mechanical Systems/Design:

The following two courses:

ENGRD 202 Mechanics of Solids

ENGRD 203 Dynamics

One or more of the following:

M&AE 212 Mechanical Properties and Processing of Engineering Materials

M&AE 225 Mechanical Design and Synthesis

M&AE 325 Mechanical Design and Analysis

M&AE 326 System Dynamics

The remainder from this list, of which at least one course must satisfy requirement 1b:

M&AE 306 Spacecraft Engineering

M&AE 386/486 Automotive Engineering

M&AE 412 Smash and Crash: Mechanics of Large Deformations

M&AE 417 Introduction to Robotics: Dynamics, Control, Design

M&AE 464 Design for Manufacture

M&AE 478 Feedback Control Systems

M&AE 490 Special Investigations in Mechanical and Aerospace Engineering

M&AE 491 Design Projects in Mechanical and Aerospace Engineering

M&AE 514 Design for Manufacture and Assembly

M&AE 565 Biomechanical Systems—Analysis and Design

M&AE 570 Applied Dynamics

Preparation in Aerospace Engineering

Although there is no separate undergraduate program in aerospace engineering, students may prepare for a career in this area by majoring in mechanical engineering and taking courses from the aerospace engineering concentration such as M&AE 305, 306, 506, and 507. Students may prepare for the graduate program in aerospace engineering by majoring in mechanical engineering, in other appropriate engineering specialties such as electrical engineering or engineering physics, or in the physical sciences. Other subjects recommended as preparation for graduate study include thermodynamics, fluid mechanics, applied mathematics, chemistry, and physics.

Master of Engineering (Aerospace) Degree Program

The M.Eng. (Aerospace) degree program provides a one-year course of study for those who wish to develop a high level of competence in engineering science, current technology, and engineering design.

The program is designed to be flexible so that candidates may concentrate on any of a variety of specialty areas. These include aerodynamics, acoustics and noise, turbulent flows, non-equilibrium flows, combustion, dynamics and control, computational fluid dynamics, etc.

A coordinated program of courses for the entire year is agreed upon by the student and the faculty advisor. Any subsequent changes must also be approved by the committee. An individual student's curriculum includes a four- to eight-credit design course, consisting of a minimum of 12 credits in aerospace engineering or a closely related field, and sufficient technical electives to meet the total degree requirement of 30 credits (of which at least 28 credits must have letter grades).

The design projects may arise from individual faculty and student interests or from collaboration with industry. All projects must have an aerospace engineering design focus and have the close supervision of a faculty member.

All courses must be of true graduate nature. In general, all courses must be beyond the level of those required in an undergraduate engineering program; credit may be granted for an upper-level undergraduate course if the student has done little or no previous work in that subject area, but such courses must have the special approval of the M&AE Master of Engineering Committee.

The technical electives may be courses of appropriate level in mathematics, physics, chemistry, or engineering; a maximum of six credits may be taken in areas other than these if the courses are part of a well-defined program leading to specific professional objectives. It is expected that all students will use technical electives to develop proficiency in mathematics beyond the minimum required of Cornell engineering undergraduates if they have not already done so before entering the program. Courses in advanced engineering mathematics or statistics are particularly recommended.

Students should check with the M&AE graduate field office (104 Upson Hall) for additional degree requirements.

Master of Engineering (Mechanical) Degree Program

The M.Eng. (Mechanical) degree program provides a one-year course of study for those who wish to develop a high level of competence in engineering science, current technology, and engineering design.

The program is designed to be flexible so that candidates may concentrate on any of a variety of specialty areas. These include biomechanical engineering, combustion, propulsion and power systems, fluid mechanics, heat transfer, materials and manufacturing engineering, mechanical systems and design, etc.

A coordinated program of courses for the entire year is agreed upon by the student and the faculty advisor. Any subsequent changes must also be approved by the committee. An individual student's curriculum includes a four- to eight-credit design course, a minimum of 12 credits in mechanical engineering or a closely related field, and sufficient technical electives to meet the total degree requirement of 30 credits (of which at least 28 credits must have letter grades).

The design projects may arise from individual faculty and student interests or from collaboration with industry. All projects must have a mechanical engineering design focus and have the close supervision of a faculty member.

All courses that constitute the major concentration must be of true graduate nature. In general, all courses must be beyond the level of those required in an undergraduate engineering program; credit may be granted for an upper-level undergraduate course if the student has done little or no previous work in that subject area, but such courses must have the special approval of the M&AE Master of Engineering Committee.

The technical electives may be courses of appropriate level in mathematics, physics, chemistry, or engineering; a maximum of six

credits may be taken in areas other than these if the courses are part of a well-defined program leading to specific professional objectives. It is expected that all students will use technical electives to develop proficiency in mathematics beyond the minimum required of Cornell engineering undergraduates if they have not already done so before entering the program. Courses in advanced engineering mathematics or statistics are particularly recommended.

Students should check with the M&AE graduate field office (104 Upson Hall) for additional degree requirements.

Students enrolled in the M.Eng. (Mechanical) degree program may take courses that also satisfy the requirements of the manufacturing, energy, or electronic packaging option programs leading to special dean's certificates in those areas.

NUCLEAR SCIENCE AND ENGINEERING

Faculty members in the graduate Field of Nuclear Science and Engineering who are most directly concerned with the curriculum include K. B. Cady, D. A. Hammer, R. W. Kay, V. O. Kostroun, and K. Ünlü

Undergraduate Study

Although there is no special undergraduate field program in nuclear science and engineering, students who intend to enter graduate programs in this area are encouraged to begin specialization at the undergraduate level. This may be done by choice of electives within regular field programs (such as those in engineering physics, materials science and engineering, computer science, and civil, chemical, electrical, or mechanical engineering) or within the College Program.

Master of Engineering (Nuclear) Degree Program

The two-term curriculum leading to the M.Eng. (Nuclear) degree is intended primarily for individuals who want a terminal professional degree, but it may also serve as preparation for doctoral study in nuclear science and engineering. The course of study covers the basic principles of nuclear reactor systems with a major emphasis on reactor safety and radiation protection and control. The special facilities of the Ward Center for Nuclear Sciences are described in the *Announcement of the Graduate School.*

The interdisciplinary nature of nuclear engineering allows students to enter from a variety of undergraduate specializations. The recommended background is (1) an accredited baccalaureate degree in engineering, physics, or applied science; (2) physics, including atomic and nuclear physics; (3) mathematics, including advanced calculus; and (4) thermodynamics. Students should see that they fulfill these requirements before beginning the program. In some cases, deficiencies in preparatory work may be made up by informal study during the preceding summer. General admission and degree requirements are described in the college's introductory section.

The following courses, or equivalents, are included in the 30-credit program:

Fall term

NS&E 509, Nuclear Physics for Applications

A&EP 612, Nuclear Reactor Theory

A&EP 633, Nuclear Engineering

Technical elective

Spring term

NS&E 551, Nuclear Measurements in Research

NS&E 545, Energy Seminar

Technical elective

Engineering design project

Mathematics or physics elective

Engineering electives should be in a subject area relevant to nuclear engineering, such as energy conversion, radiation protection and control, feedback control systems, magnetohydrodynamics, controlled thermonuclear fusion, and environmental engineering. The list below gives typical electives.

A&EP 606/ECE 581, Introduction to Plasma Physics (fall, 4 credits)

A&EP 607/ECE 582, Basic Plasma Physics (spring, 4 credits)

A&EP 661, Microcharacterization (fall, 3 credits)

ECE 457, Silicon Device Fundamentals (fall, 4 credits with lab)

ECE 471/M&AE 478/CHEME 372, Feedback Control Systems (fall, 4 credits)

MS&E 459, Physics of Modern Materials Analysis (spring, 3 credits)

MS&E 603, Analytical Techniques for Materials Science (spring, 4 credits)

NS&E 484/A&EP 484/ECE 484/M&AE 459, Introduction to Controlled Fusion: Principles and Technology (spring, 3 credits)

NS&E 521, Radiation Effects in Materials (fall, 1–3 credits)

OPERATIONS RESEARCH AND INDUSTRIAL ENGINEERING

K. B. Athreya, L. J. Billera, R. G. Bland, M. J. Eisner, S. Henderson, P. L. Jackson, R. A. Jarrow, W. L. Maxwell, J. A. Muckstadt, N. Prabhu, P. Protter, J. Renegar, S. I. Resnick, R. Roundy, D. Ruppert, G. Samorodnitsky, D. Shmoys, É. Tardos, M. J. Todd, L. E. Trotter, Jr., B. W. Turnbull

Bachelor of Science Curriculum in Operations Research and Engineering

The program is designed to provide a broad education in the techniques and modeling concepts needed to analyze and design complex systems and to provide an introduction to the technical and professional areas with which operations researchers and industrial engineers are concerned. The program prepares students for a wide range of careers including operations research, industrial engineering, entrepreneurship, information technology, operations management, consulting, financial engineering, financial services, and management.

The foundation of the B.S. curriculum is the development of basic skills in calculus, statistics, probability, mathematical programming, and computer science. Required courses in manufacturing systems and simulation build on these skills and provide engineering design experiences. The curriculum culminates in a major engineering design experience in one of two required OR&IE electives, OR&IE 416 or 480.

Because of the wide range of career goals among our students, the B.S. program is designed with a minimum of required courses and a large number of required electives. Students should consult with their field advisers to select electives that best meet their future goals.

The program is accredited as a "nontraditional" program by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). The faculty have not sought accreditation of the B.S. curriculum as a program in industrial engineering. Industrial engineering curricula, while excellent for preparing industrial engineers, do not have the flexibility that the wide range of our students requires. Nonetheless, by proper selection of field electives, graduates of the B.S. program can and do become highly successful and competent industrial engineers. (Exceptional students interested in pursuing graduate studies are encouraged to speak with their faculty advisers concerning an accelerated program of study.)

A student who intends to enter the field program in Operations Research and Engineering should plan to take Basic Engineering Probability and Statistics (ENGRD 270) after completing MATH 192. Early consultation with a faculty member of the school or with the associate director for undergraduate studies can be helpful in making appropriate choices. The required courses for the OR&E field program and the typical terms in which they are taken are as follows:

Term 2, 3, or 4	*Credits*
ENGRD 211, Computers & Programming	3
Term 5	
OR&IE 320, Optimization I	4
OR&IE 350, Financial and Managerial Accounting	4
OR&IE 360, Engineering Probability and Statistics II	4
A course in humanities and social sciences	3
Field-approved elective	3
Term 6	
OR&IE 310, Industrial Systems Analysis	4 (may be taken in term 4)
OR&IE 321, Optimization II	4
OR&IE 361, Introductory Engineering Stochastic Processes I	4
Behavioral science (organizational behavior)†	3
Course in humanities and social sciences	3

†The behavioral science requirement can be satisfied by any one of several courses, including the Johnson Graduate School of Management (JGSM) course, NCC 554 (offered only in the fall), which is recommended for those contemplating the pursuit of a graduate business degree, ILROB 170, 171, and 320, and H ADM 115.

The basic senior-year program, from which individualized programs are developed, consists of the following courses:

	Minimum credits
OR&IE 581, Simulation Modeling	2
OR&IE 582, Simulation Analysis	2
To satisfy the ABET design requirement, students are required to take either OR&IE 416 or 480.	
Three upperclass OR&IE electives as described below	9
Two field-approved electives (at least 3 credits must be outside OR&IE)	6
Two courses in humanities and social sciences	6
Two approved electives	6

Available OR&IE electives are as follows:

Manufacturing and distribution systems: OR&IE 414, 416, 451, 480, 481, 518, 524, 525, and 562 and JGSM NBA 641

Optimization methods: OR&IE 431, 432, 434, 435, and 436

Applied probability and statistics: OR&IE 462, 474, 476 (2 credits), 561, 563, 575 (2 credits), 576 (2 credits) and 577

Scholastic requirements for the field are a passing grade in every course; a grade of C- or better in each of ENGRD 211 and 270, OR&IE 310, 320, 321, 350, 360, and 361; an overall average of at least 2.0 for each term the student is enrolled in the school; an average of 2.0 or better for OR&IE field courses; and satisfactory progress toward the completion of the degree requirements. The student's performance is reviewed at the conclusion of each term.

Operations Research and Engineering Honors Program

Eligibility

The Bachelor of Science degree with honors will be granted to students who, in addition to having completed the requirements for a bachelor degree, have satisfactorily completed the honors program in Operations Research and Engineering and have been recommended for the degree by the honors committee of the department. An honors program student must enter with and maintain a cumulative GPA≥ 3.5.

Content

An OR&E honors program shall consist of at least nine credits beyond the minimum required for graduation in OR&E, so that no part of the honors program can also be used to satisfy graduation requirements. The nine credits shall be from one or more of the following with at least four hours in the first category:

1. Advanced courses in OR&IE at the 500-level or above.
2. A significant research experience or honors project under the direct supervision of an OR&IE faculty member using OR&IE 499: OR&IE Project. A significant written report must be submitted as part of this component.
3. A significant teaching experience under the direct supervision of a faculty member in OR&IE using OR&IE 490: Teaching in OR&IE, or ENGRG 470: Undergraduate Engineering Teaching.

Timing

All interested students must complete a written application no later than the end of the third week of the first semester of their senior year, but are encouraged to make arrangements with a faculty member during the first semester of their junior year. A student must be in the program for at least two semesters before graduation.

Procedures

Each application to the OR&E honors program must have a faculty adviser to supervise the honors program. The honors adviser need not be the student's faculty adviser. The application to the program shall be a letter from the student describing the specific proposed honors program and including the explicit approval of the honors adviser. Each program must be approved by the associate director, and any changes to the student's program must also be approved by the associate director of undergraduate studies.

Engineering Minor Programs

The School of Operations Research and Industrial Engineering currently offers three engineering minor programs: engineering statistics, industrial systems and information technology, and operations research and management science. (A student may not receive credit for more than one minor offered by the School of Operations Research and Industrial Engineering.) Descriptions and requirements for each program follow:

Minor in Engineering Statistics

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the engineering statistics minor: ABEN, A&EP, CEE, CHEME, COM S, EAS, ECE, M&AE, MS&E.

This minor requires the student to develop expertise in engineering statistics. The goal of the program is to provide the student with a firm understanding of statistical principles and engineering applications, and the ability to apply this knowledge in real-world situations.

The requirements for the engineering statistics minor are outlined below. For further details consult the Operations Research and Industrial Engineering Undergraduate Programs Office, 202 Rhodes Hall.

Requirements

To complete the minor, the student must take at least six courses (minimum of 18 credits), chosen as follows:

I. Required Courses:

ENGRD 270 Basic Engineering Probability & Statistics

OR&IE 360 or ECE 310 Basic Engineering Probability & Statistics II or Introduction to Probability & Random Signals

II. Four courses (11 credits minimum) taken from the following list*:

OR&IE 361 or ECE 411 Introductory Engineering Stochastic Processes I or Random Signals in Communications/ Signal Processing

OR&IE 476 Applied Linear Statistical Models

OR&IE 576 Regression

OR&IE 563 Applied Time Series Analysis

OR&IE 565 Applied Financial Engineering

OR&IE 575 Experimental Design

OR&IE 577 Quality Control

OR&IE 581 Simulation Modeling

OR&IE 582 Simulation Analysis

MATH 472 or BTRY 409 Basic Probability or Theory of Statistics

BTRY 602 Statistical Methods II

BTRY 603 or ILRST 411 Statistical Methods III or Statistical Analysis of Qualitative Data

ILRST 310 Statistical Sampling

ILRST 314 Graphical Methods for Data Analysis

ILRST 410 Techniques of Multivariate Analysis

*Other course options approved by petition in advance. The student should be aware that some of these courses require others as prerequisites. All these courses are cross-listed under the Department of Statistical Science.

Academic Standards: a letter grade of C- or better for each course in the minor and a cumulative GPA of 2.0 or better for all courses in the minor.

Minor in Industrial Systems and Information Technology

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the industrial systems and information technology minor: ABEN, A&EP, CEE, CHEME, COM S, EAS, ECE, M&AE, MS&E.

The aim of this minor is to provide an in-depth education in the issues involved in the design and analysis of industrial systems, and the tools from information technology that have become an integral part of the manufacturing process. Students will become familiar with the problems, perspectives, and methods of modern industrial engineering and be prepared to work with industrial engineers in designing and managing manufacturing and service operations. That is, rather than providing a comprehensive view of the range of methodological foundations of operations research, this minor is designed to give the student a focused education in the application area most closely associated with these techniques.

The requirements for the industrial systems and information technology minor are outlined below. For further details consult the Operations Research and Industrial Engineering Undergraduate Programs Office, 200 Rhodes Hall.

Requirements

To complete the minor, the student must take at least six courses (minimum of 18 credits), chosen as follows:

I. At least three of the following:

ENGRD 270 Basic Engineering Probability and Statistics

OR&IE 310 Industrial Systems Analysis

OR&IE 320 Optimization I

OR&IE 480 Information Technology for Operations Research and Industrial Technology

II. The remaining courses/credit hours from the following:

OR&IE 350 Financial and Managerial Accounting

OR&IE 416 Design of Manufacturing Systems

OR&IE 451 Economic Analysis of Engineering Systems

OR&IE 525 Production Planning and Scheduling Theory and Practice

OR&IE 552 Revenue Management

OR&IE 577 Quality Control

OR&IE 581 Simulation Modeling

Academic Standards: A letter grade of C- or better for each course in the minor and a cumulative GPA of 2.0 or better for all courses in the minor.

Minor in Operations Research and Management Science

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the operations research and management science minor: ABEN, A&EP, CEE, CHEME, COM S, EAS, ECE, M&AE, MS&E.

The field of operations research and management science (OR/MS) aims to provide rational bases for decision making by seeking to understand and model complex situations and to use this understanding to predict system behavior and improve system performance. This minor gives the student the opportunity to obtain a wide exposure to the core methodological tools for OR/MS, including mathematical programming, stochastic and statistical models, and simulation. The intent of this minor is that the student should obtain a broad knowledge of these fundamentals, rather than train the student in a particular application domain. This way the student can adjust their advanced courses and pursue either methodological or application oriented areas of greatest interest and relevance to the overall educational goals of their program.

The requirements for the operations research and management science minor are outlined below. For further details consult the Operations Research and Industrial Engineering Undergraduate Programs Office, 200 Rhodes Hall.

Requirements

To complete the minor, the student must take at least six courses (minimum of 18 credits), chosen as follows:

I. Choose three courses from the following list:

ENGRD 270 Basic Engineering Probability and Statistics

OR&IE 320 Optimization I

OR&IE 321 Optimization II

OR&IE 360 Engineering Probability and Statistics II

OR&IE 361 Introduction Engineering Stochastic Processes I

OR&IE 581 Simulation Modeling

OR&IE 582 Simulation Analysis

II. These courses are to be supplemented with additional OR&IE courses at the 300 level or higher, so that entire program includes at least six courses and at least 18 credits. For example, taking the remaining three options on this list would suffice.

Academic Standards: a letter grade of C- or better for each course in the minor and a cumulative GPA of or better for all courses in the minor.

Master of Engineering (OR&IE) Degree Program

This two-semester professional degree program stresses applications of operations research and industrial engineering. The centerpiece of the program is a team-based project on a real problem. The course work centers on additional study of analytical techniques, with particular emphasis on engineering applications, especially in the design or improvement of systems in manufacturing, information, finance, and nonprofit organizations.

General admission and degree requirements are described in the introductory "Degree Programs" section. The M.Eng. (OR&IE) program is intended for three groups of students: graduates of the undergraduate field program in OR&E who wish to expand their practical knowledge of the field; Cornell undergraduates in other math-based fields who want to broaden their exposure to OR&IE; and qualified non-Cornellians with strong backgrounds from other programs in the United States and abroad.

To ensure completion of the program in two semesters, the entering student should have completed courses in probability and statistics and in computer science, as well as four semesters of mathematics, through differential equations, linear algebra, and multivariate calculus.

Program requirements include a core of OR&IE courses plus technical electives chosen from a broad array of offerings. The choice of a particular elective sequence plus a specific project course results in completion of one of several options within the program. These include the applied operations research option, the manufacturing option, the financial engineering option, the systems engineering option, the information technology concentration, and the Semester in Manufacturing. These options are offered jointly with various other Cornell departments and schools and provide the opportunity to interact on projects and in class with specialists in other engineering fields and in business. Many students select the applied operations research option, offered only by OR&IE, which has project teams made up entirely of OR&IE M.Eng. students and which offers the broadest choice of elective courses. Students interested in an option other than the applied operations research option should obtain further information from the following: manufacturing option, Center for Manufacturing Enterprise, 103 Frank H. T. Rhodes Hall, 607–255–7757; financial engineering option and information technology option, 201 Frank H. T. Rhodes Hall, Semester in Manufacturing option, 304 Sage Hall, 607–255–4691; systems engineering option, 218 Upson Hall, 607–255–0710.

I. For matriculants with preparation comparable to that provided by the undergraduate Field Program in Operations Research and Engineering:

Fall term	*Credits*
OR&IE 516, Case Studies	1
OR&IE 893, Applied OR&IE Colloquium	1
M.Eng. Project	1
Technical electives	12
Spring term	
OR&IE 894, Applied OR&IE Colloquium	1
M.Eng. Project	minimum of 4
Technical electives	9

II. For matriculants from other fields who minimally fulfill the prerequisite requirements (students who have the equivalent of OR&IE 520, 523, and 560 will take other OR&IE electives in their place):

Fall term	*Credits*
OR&IE 560, Engineering Probability and Statistics II	4
OR&IE 520, Optimization I	4
OR&IE 522, Topics in Linear Optimization	1
OR&IE 516, Case Studies	1
OR&IE 580, Design and Analysis of Simulated Systems	4
OR&IE 893, Applied OR&IE Colloquium	1
M. Eng. Project	1
Spring term	
OR&IE 523, Introduction to Stochastic Processes I	4
OR&IE 894, Applied OR&IE Colloquium	1
M.Eng. Project	minimum of 4
Technical electives	6

For both of the above pro forma schedules, at least 12 credit hours of the specified electives must be chosen from the list of courses offered by the School of Operations Research and Industrial Engineering. For scheduling reasons, some options may require an additional summer, depending on the student's preparations.

A minimum of 30 credit hours are required to complete this program. Additional program requirements exist and are described in the *Master of Engineering Handbook*, which is available in Room 201, Frank H. T. Rhodes Hall and on the web at www.orie.cornell.edu.

The project requirement can be filled in a variety of ways. Common elements in all project experiences include working as part of a group of three to five students on an engineering design problem, meeting with a faculty member on a regular basis, and oral and written presentation of the results obtained. Most projects address problems that actually exist in manufacturing firms, financial firms, and service organizations such as hospitals.

Cooperative Program with the Johnson Graduate School of Management

Undergraduates majoring in operations research and engineering may be interested in a cooperative program at Cornell that leads to

both Master of Engineering and Master of Business Administration (M.B.A.) degrees. With appropriate curriculum planning, such a combined B.S./M. Eng./M.B.A. program can be completed in six years at Cornell, with time out for work experience. For undergraduates from other schools, it may be feasible to complete the M. Eng./M.B.A. program in two years, possibly with an intervening summer or time out for work experience if they do not already have it on coming to Cornell. This accelerated program often incorporates the Twelve-Month M.B.A. Program of the Johnson Graduate School of Management (JGSM).

An advantage for OR&E majors is that, as part of their undergraduate and/or M. Eng. curriculum, they study several subjects that are required for the M.B.A. degree. (This is because modern management is concerned with the operation of production and service systems, and much of the analytical methodology required to deal with operating decisions is the same as that used by systems engineers in designing these systems.) This early start on meeting the business-degree requirements permits degrees in two years rather than the usual three years for such a combination.

The details of planning courses for this program should be discussed with the admissions office of the JGSM. Since 95 percent of the students in the JGSM have work experience, there will typically be a gap for work experience between the M. Eng. and M.B.A. portions of the program for students who do not already have it when beginning the M. Eng. portion.

Further details and application forms may be obtained at the office of the School of Operations Research and Industrial Engineering, 201 Frank H. T. Rhodes Hall, and at the admissions office of the Johnson Graduate School of Management.

The Knight Scholars program, open to Cornell engineering graduates, provides financial support for the M.Eng./M.B.A. combination. Further details are available in 146 Olin Hall, (607) 255–7413.

STATISTICAL SCIENCE DEPARTMENT

The university-wide Department of Statistical Science coordinates undergraduate and graduate study in statistics and probability. A list of suitable courses can be found in the Interdisciplinary Centers, Programs, and Studies section at the front of this catalog (see p. 24).

THEORETICAL AND APPLIED MECHANICS

T. J. Healey, chair; J. A. Burns, K. B. Cady, C. Castillo-Chavez, H. D. Conway, J. M. Guckenheimer, E. W. Hart, J. T. Jenkins, C. Y. Hui, S. Mukherjee, S. L. Phoenix, R. H. Rand, P. Rosakis, A. L. Ruina, W. H. Sachse, S. Strogatz, Z. J. Wang, A. Zehnder

Undergraduate Study

The Department of Theoretical and Applied Mechanics is responsible for courses in engineering mechanics and engineering mathematics, some of which are part of the Common Curriculum.

College Program in Engineering Science

A student may enroll in the College Program in Engineering Science, which is sponsored by the Department of Theoretical and Applied Mechanics. The College Program is described in the section on undergraduate study in the College of Engineering.

Minor in Applied Mathematics

Eligibility

Engineering undergraduates affiliated with the following fields are eligible to participate in the Applied Mathematics minor: ABEN, A&EP, CEE, CHEME, COM S, EAS, ECE, M&AE, MS&E, OR&IE.

Requirements

To complete the minor, the student must take at least six courses beyond MATH 294, to be chosen as follows:

a) No more than one course may be chosen from any one of the groups 1, 2, 3, or 4.

b) At least three courses must be chosen from groups 5 and 6.

c) No more than one 200-level course may be chosen.

d) No more than one course may be chosen which is offered by the student's major department.

1. Analysis

   T&AM 310 Advanced Engineering Analysis I

   MATH 321 Applicable Analysis

   MATH 420 Applicable Analysis

   A&EP 321 Mathematical Physics I

2. Computational Methods

   COM S/ENGRD 222 Introduction to Scientific Computation

   CEE/ENGRD 241 Engineering Computation

   ABEN 449 Computational Tools for Engineers

   OR&IE 320 Optimization I

3. Probability and Statistics

   OR&IE/ENGRD 270 Basic Engineering Probability and Statistics

   OR&IE 360 Engineering Probability and Statistics II

   ECE 310 Introduction to Probability and Random Signals

   CEE 304 Uncertainty Analysis in Engineering

   MATH 371 Basic Probability

4. Applications

   A&EP 333 Mechanics of Particles and Solid Bodies

   CHEME 323 Fluid Mechanics

   CEE 331 Fluid Mechanics

   CEE 371 Structural Behavior

   ECE 425 Digital Signal Processing

   MS&E 303 Thermodynamics of Condensed Systems

   M&AE 323 Introductory Fluid Mechanics

5. Advanced Courses

—Only one of the following three may be chosen:

   T&AM 311 Advanced Engineering Analysis II

   MATH 422 Applicable Analysis II

   A&EP 322 Mathematical Physics II

—Only one of the following two may be chosen:

   ECE 411 Random Signals in Communications and Signal Processing

   OR&IE 361 Introductory Engineering Stochastic Processes I

—Only one of the following two may be chosen:

   COM S 381 Introduction to Theory of Computing

   COM S 481 Introduction to Theory of Computing

   COM S 482 Introduction to the Design of Algorithms

   OR&IE 321 Optimization II

   OR&IE 431 Discrete Models

   OR&IE 435 Introduction to Game Theory

   OR&IE 462 Introductory Engineering Stochastic Processes II

   ECE 522 Nonlinear Systems: Analysis, Stability, Control, and Applications

—Only one of the following two may be chosen:

   M&AE 571 Applied Dynamics

   T&AM 570 Intermediate Dynamics

   T&AM 578 Nonlinear Dynamics and Chaos

6. Math Courses—Any 300+ level course offered by the mathematics department in algebra, analysis, probability/statistics, geometry, or logic, with the following exceptions:

   1) MATH 321 or MATH 420, if any course from group 1 is chosen

   2) MATH 371, if any course from group 3 is chosen

   3) MATH 422, if T&AM 311, MATH 422, or A&EP 322 are chosen from group 5

Academic Standards: A letter grade of C or better for each course in the minor.

Minor in Biomedical Engineering

Eligibility

All undergraduates in the College of Engineering are eligible to participate in the biomedical engineering minor, unless they are also pursuing the bioengineering option. (Students may participate in either the bioengineering option OR the biomedical engineering minor, but not both.)

Requirements

To complete the minor, the student must take at least six courses (minimum of 18 credits) from the five groups listed below, with at least one course from each group. At least four of the six courses must be from outside the student's major. In addition, all students must take ENGRG 501, Bioengineering Seminar (1 credit).

Required Course: ENGRG 501, Bioengineering Seminar (1 credit)

I. Biomaterials and Biomechanics

ABEN 365 (3) Properties of Biological Materials

MS&E 265 (3) or TXA 439 (2) Biological Materials and Their Synthetic Replacements

MS&E 463 (3) Neuromuscular Biomechanics

M&AE 464 (3) Orthopaedic Tissue Mechanics

M&AE 565 (3) Biomechanical Systems—Analysis and Design

M&AE 664 (3) Mechanics of Bone

ENGRG 605.3 (1) Biomaterials

ENGRG 606.1 (1) Artificial Organs and Tissue Engineering

ENGRG 606.3 (1) Biomechanics of Musculoskeletal Systems

II. Biomedical Systems

ABEN 453 (3) Computer-Aided Engineering: Applications to Biomedical and Food Processes

CHEME 481 (3) Biomedical Engineering

ABEN 454 (3) Physiological Engineering

ENGRG 605.1 (1) Cellular Dynamics and Cancer

ENGRG 605.2 (1) Physiological Systems

III. Instrumentation

ABEN 418 (3) Introduction to Biotechnology

ECE 432 (3) MicroElectro Mechanical Systems (MEMS)

ECE 593 (3) Bioelectric Signal Analysis and Processing

ENGRG 606.2 (1) Biomedical Instrumentation and Diagnosis

ABEN 658 (4) Biosensors and Bioanalytical Techniques

IV. Molecular and Cell Biology

BIOGD 281 (5) Genetics

BIOGD 282 (2–3) Human Genetics

BIOMI 290 (3) Microbiology

BIOAP 316 (4) Cellular Physiology

BIOBM 330–333 (2–4) Principles of Biochemistry

BIOBM 432 (3) Survey of Cell Biology

V. Physiology

BIOAP 212 (3) Human Physiology

BIOAP 311 (3) Introductory Animal Physiology

BIOAP 313 (4) Histology: The Biology of the Tissues

BIOGD 389 (3) Embryology

BIONB 222 (3–4) Neurobiology and Behavior II: Introduction to Neurobiology

AN SC 427 (3) Fundamentals of Endocrinology

M&AE 463 (3) Neuromuscular Biomechanics

Academic Standards: A letter grade of C- or better for each course in the minor and a cumulative GPA of 2.0 or better for all courses in the minor.

Note: ENGRG 605–606 and MAE 664 are graduate courses with limited enrollment. First preference will be given to graduate students.

Master of Engineering (Engineering Mechanics) Degree Program

Composite materials designed to meet specific requirements of weight, strength, and rigidity are used increasingly in the manufacture of everyday structures and components. The Master of Engineering (Engineering Mechanics) degree program focuses on the mechanical behavior of advanced composite materials and structures and prepares students to play a role in the development of this new technology. Students from diverse engineering backgrounds, such as mechanics, structures, and materials, as well as aerospace and biomedical engineering, can normally complete the requirements for the professional Master of Engineering degree in one year.

The degree program requires satisfactory completion of 30 credits of course work, including 12 credits of courses that involve analysis, computation, design, or laboratory experience. Of these 12 credits, at least six must be earned in T&AM. Up to 10 credits will be awarded for an individual project involving composites. The balance of the required credits may be earned in elective courses chosen from those in the course listing below or others approved by the student's adviser.

The Department of Theoretical and Applied Mechanics has several laboratories equipped for the fabrication and mechanical testing of composite materials and structures. Extensive computing resources are available for numerical computations, design, or other numerical- or simulation-research activities related to composites. The Materials Science Center, the Center for Theory and Simulation in Science and Engineering, and the Computer-Aided Design Instructional Facility provide additional state-of-the-art laboratories and computer resources.

ENGINEERING COURSES

Courses offered in the College of Engineering are listed under the various departments and schools.

Courses are identified with a standard abbreviation followed by a three-digit number.

Engineering Communications	ENGRC
Engineering Distribution	ENGRD
Engineering General Interest	ENGRG
Introduction to Engineering	ENGRI
Agricultural and Biological Engineering	ABEN
Applied and Engineering Physics	A&EP
Chemical Engineering	CHEME
Civil and Environmental Engineering	CEE
Computer Science	COM S
Earth and Atmospheric Sciences (formerly Geological Sciences)	EAS
Electrical and Computer Engineering	ECE
Materials Science and Engineering	MS&E
Mechanical and Aerospace Engineering	M&AE
Nuclear Science and Engineering	NS&E
Operations Research and Industrial Engineering	OR&IE
Theoretical and Applied Mechanics	T&AM

ENGINEERING COMMON COURSES

Engineering Communications Courses

Courses in this category, offered by the Engineering Communications Program, develop writing and oral presentation skills relevant to engineers.

ENGRC 301 Writing in Engineering
TBA. 1 credit. Prerequisite: permission of instructor. Can be used to satisfy requirements in expressive arts as a free or approved elective. *This course can only be taken in conjunction with a "writing-intensive" engineering class.*
Some "writing-intensive" engineering classes may require students to enroll in this supplementary course. Instructors from the Engineering Communications Program work with engineering faculty members to prepare students for writing assignments. Intended to strengthen understanding of the course content while enhancing communications skills. May be taken more than once, with different engineering courses.

ENGRC 333 Topics in Engineering Communications
TBA. 3 credits.
Topics vary as the need and interest arise. Sample topics include introductory technical communications, graphic presentation of engineering material, desktop publishing, information technologies, advanced problems in engineering communications, technology, and the law. Fulfills the college technical writing requirement.

ENGRC 334 Independent Study In Engineering Communications
TBA. Variable credits (1–3).
Students work closely with a Communications Program instructor to pursue an aspect of professional communications not available through regular course work. Projects may involve writing technical documentation, creating user manuals, analyzing and producing technical graphics, or reading and writing about problems in engineering practice. Interested students should contact the Engineering Communications Program.

ENGRC 335 Communications For Engineering Managers
TBA. 3 credits. Limited to 20 students per section. Prerequisite: two First-Year Writing Seminars.
This interactive workshop focuses on communications in organizational contexts common to engineering graduates. ENGRC 335 helps students to produce effective business and technical communication—written, oral, and visual. Topics include internal and external communications; balancing visual and verbal elements in documents and presentations; teamwork and leadership; running and attending meetings; management strategies; communicating to colleagues, superiors, subordinates, and

clients. Through case studies and other readings, students develop writing and management strategies that they apply in individual and collaborative assignments. By completing brief written exercises, formal and informal presentations, and a larger team project, students learn how to develop information, organize and support ideas, and address a variety of audiences. Fulfills the college technical writing requirement. Note: because space is limited, seniors are given priority.

ENGRC 350 Engineering Communications
Fall, spring, summer TBA. 3 credits. Prerequisite: two First-Year Writing Seminars. Limited to 20 students per section.
Engineering graduates spend much of their time conveying technical information to a variety of audiences. They write a range of documents, give oral presentations, and use visuals to enhance their writing and talks. These important tasks can seem daunting and burdensome; ENGRC 350 aims to make them manageable and interesting. This course draws on material from professional settings to help students develop effective processes for drafting, editing, and revising documents; communicating specialized information in different contexts; working in teams; and addressing relevant organizational and ethical issues. Students learn to communicate effectively through diverse assignments and a longer term project of their choice (for example, a research paper, feasibility study, or users' manual). The course material generates lively discussion, and the limited class size ensures close attention to each student's work. Fulfills the college technical writing requirement.

Engineering Distribution Courses

Courses in this category are sophomore-level courses cross-listed with a department. These courses are intended to introduce students to more advanced concepts of engineering and may require pre- or corequisites.

ENGRD 201 Introduction to the Physics and Chemistry of the Earth (also EAS 201)
Fall. 3 credits. Prerequisites: PHYS 112 or 207. L. M. Cathles.
This course covers the following topics: formation of the solar system: accretion and evolution of the earth; the rock cycle: radioactive isotopes and the geological time scale, plate tectonics, rock and minerals, earth dynamics, mantle plumes; the hydrologic cycle: runoff, floods and sedimentation, groundwater flow, contaminant transport; and the weathering cycle: chemical cycles, CO_2 (weathering), rock cycle, controls on global temperature (CO_2 or ocean currents), oil and mineral resources.

ENGRD 202 Mechanics of Solids (also T&AM 202)
Fall, spring. 3 credits. Prerequisite: PHYS 112, coregistration in MATH 293 or permission of instructor.
Covers: principles of statics, force systems, and equilibrium; frameworks; mechanics of deformable solids, stress, strain, statically indeterminate problems; mechanical properties of engineering materials; axial force, shearing force, bending moment, plane stress; Mohr's circle; bending and torsion of bars; and buckling and plastic behavior.

ENGRD 203 Dynamics (also T&AM 203)
Fall, spring. 3 credits. Prerequisite: T&AM 202, coregistration in MATH 294, or permission of instructor.
Newtonian dynamics of a particle, systems of particles, a rigid body. Kinematics, motion relative to a moving frame. Impulse, momentum, angular momentum, energy. Rigid-body kinematics, angular velocity, moment of momentum, the inertia tensor. Euler equations, the gyroscope.

ENGRD 210 Introduction to Circuits for Electrical and Computer Engineers (also ECE 210)
Fall, spring. 3 credits. Corequisites: MATH 293 and PHYS 213. Fall, C. E. Seyler; spring, D. F. Delchamps.
A first course in electrical circuits, establishing the fundamental properties of circuits with application to high-speed computers and modern electronics. Topics include node and mesh analysis applied to CMOS circuit design, transient response and its impact on computer speed, sinusoidals, resonance, complex impedance, and operational amplifiers.

ENGRD 211 Computers and Programming (also COM S 211)
Fall, spring, summer. 3 credits. Prerequisite: COM S 100 or an equivalent course in Java or C++.
Intermediate programming in a high-level language and introduction to computer science. Topics include program structure and organization, modules (classes), program development, proofs of program correctness, recursion, data structures and types (lists, stacks, queues, trees), object-oriented and functional programming, analysis of algorithms, and an introduction to elementary graph theory and graph algorithms. Java is the principal programming language. Knowledge of classes and objects is assumed.

ENGRD 219 Mass and Energy Balances (also CHEME 219)
Fall. 3 credits. Corequisite: physical chemistry or permission of instructor. K. H. Lee.
Engineering problems involving material and energy balances. Batch and continuous reactive systems in the steady and unsteady states. Introduction to phase equilibria for multicomponent systems.

ENGRD 221 Thermodynamics (also M&AE 221)
Fall, spring, summer TBA. 3 credits. Prerequisites: MATH 192 and PHYS 112.
The definitions, concepts, and laws of thermodynamics. Applications to ideal and real gases, vapor and gas power systems, refrigeration, and heat pump systems. Thermodynamic relations for simple, compressible substances. Gaseous reactions. Examples and problems are related to contemporary aspects of power generation and broader environmental issues.

ENGRD 231 Introduction to Digital Systems
Fall, spring. 3 credits. Prerequisite: COM S 100. W. E. Speight.
An introduction to basic principles, design techniques, and methodology for communication, computer, and information systems, which process digital data streams. Includes Boolean algebra, integrated circuit components, switching circuits, and systems which provide computation, data, voice, and video service.

ENGRD 241 Engineering Computation (also CEE 241)
Fall, spring. 3 credits. Prerequisites: COM S 100 and MATH 293. Corequisite: MATH 294. (Completion of MATH 294 is suggested.) J. F. Abel and W. Philpot.
This course introduces the discipline of numerical methods while developing programming and graphics proficiency with MATLAB and spreadsheets. Numerical analysis topics considered are: accuracy, precision, Taylor-series approximations, truncation and round-off errors, condition numbers, operation counts, convergence, and stability. Included are numerical methods for solving engineering problems that entail roots of functions, simultaneous linear equations, regression, interpolation, numerical differentiation and integration, and ordinary differential equations. The context and solution of partial differential equations are broached. Applications are drawn from different areas of engineering.

ENGRD 250 Engineering Applications in Biological Systems (also ABEN 250)
Fall. 3 credits. Corequisite: MATH 293. Recommended for the sophomore year. B. A. Ahner.
Case studies of engineering problems in agricultural, biological, and environmental systems, including bioremediation, crop production, environmental controls, energy, biomedicine, and food engineering. Emphasis is on the application of mathematics, physics, and the engineering sciences to energy and mass balances in biological systems.

ENGRD 261 Engineering Applications in Biological Systems (also MS&E 261)
Fall. 3 credits. S. P. Baker.
The mechanical properties of materials (strength, stiffness, toughness, ductility, and so on) and their physical origins are examined. The relationship of the elastic, plastic, and fracture behavior to microscopic structure in metals, ceramics, polymers, and composite materials is explored. Effects of time and temperature on materials properties are discussed. The emphasis of this course is on considerations for design and optimum performance of materials and engineered objects.

ENGRD 262 Introduction to the Electronic Properties of Materials (also MS&E 262)
Fall. 3 credits. Prerequisite: MATH 192; Corequisite PHYS 213 or Permission of instructor. G. Malliaras.
The course examines the electrical and optical properties of materials. Topics covered include the mechanism of electrical conduction in metals, semiconductors and insulators, the tuning of electrical properties in semiconductors, the transport of charge across metal/semiconductor and semiconductor/semiconductor junctions, and the interaction of materials with light. Applications in electrophotography, solar cells, electronics, and display technologies are discussed.

ENGRD 264 Computer-Instrumentation Design (also A&EP 264)
Fall, spring. 3 credits. Prerequisites: COM S 100. 1 lec, 1 lab.
This course covers the use of a small computer in an engineering or scientific research laboratory. Various experiments are performed using a PC (Pentium III, 450 MHZ CPU) running Windows 98. The experiments and devices to be investigated include: input and output ports, analog to digital converters

(ADC), digital to analog converters (DAC), thermistors, optical sensors, digital temperature control, nonlinear least squares curve fitting of experimental data, thermal diffusion, and viscosity of fluids. A second goal of this course is to develop effective written communication skills in the context of science and engineering. A number of rhetorical principles are presented that can produce clarity in communication without oversimplifying scientific issues. Students prepare progress reports, technical reports, and formal articles based on the experiments.

ENGRD 270 Basic Engineering Probability and Statistics

Fall, spring, summer. 3 credits. Pre- or corequisite: MATH 293. Fall, D. Dalthorp; spring, L. Trotter.

This course gives students a working knowledge of basic probability and statistics and their application to engineering. Computer analysis of data and simulation are included. Topics include random variables, probability distributions, expectation, estimation, testing, experimental design, quality control, and regression.

ENGRD 321 Numerical Methods in Computational Molecular Biology (also BIOBM 321 and COM S 321)

Fall. 3 credits. Prerequisites: at least one course in calculus such as MATH 106, 111, or 191 and a course in linear algebra such as MATH 221 or 294 or BTRY 417. COM S 100 or equivalent and some familiarity with iteration, arrays, and procedures. Staff.

An introduction to numerical computing using Matlab organized around five applications: the analysis of protein shapes, dynamics, protein folding, score functions, and field equations. Students become adept at plotting, linear equation solving, least squares fitting, and cubic spline interpolation. More advanced problem-solving techniques that involve eigenvalue analysis, the solution of ordinary and partial differential equations, linear programming, and nonlinear minimization are also treated. The goal of the course is to develop a practical computational expertise with Matlab and to build mathematical intuition for the problems of molecular biology. COMA majors may use only one of the following towards their degree: COM S 321, 322, or 421.

ENGRD 322 Introduction to Scientific Computation (also COM S 322)

Spring, summer. 3 credits. Prerequisites: COM S 100 and (MATH 222 or 294).

An introduction to elementary numerical analysis and scientific computation. Topics include interpolation, quadrature, linear and nonlinear equation solving, least-squares fitting, and ordinary differential equations. The MATLAB computing environment is used. Vectorization, efficiency, reliability, and stability are stressed. Special lectures cover parallel computation.

Courses of General Interest

Courses in this category are of general interest and cover technical, historical, and social issues relevant to the engineering profession. These courses may also include seminar or tutorial type courses.

ENGRG 102 Drawing and Engineering Design (also M&AE 102)

Fall, spring. 1 credit. Half-term course offered twice each semester. Enrollment limited to 30 students each half-term. Recommended for students without mechanical drawing experience. Letter grade required for students majoring in M&AE; S-U grades optional for all others.

Introduction to drawing, and graphic techniques useful in design, analysis, and presentation of ideas. Computer-aided design is integral to the course-work and final design project.

ENGRG 150 Engineering Seminar

Fall. 1 credit. First-year students only. S-U grades only.

Engineering freshmen meet weekly with their faculty advisers to discuss a range of engineering topics. Discussions may include the engineering curriculum and student programs, what different types of engineers do, the character of engineering careers, active research areas in the college and in engineering in general, and study and examination skills useful for engineering students. Groups may visit campus academic, engineering, and research facilities.

ENGRG 198 Introduction to the Electronic Revolution (also ECE 198)

Summer only. 3 credits. Cannot be taken in addition to ENGRG 298.

This course is an introductory survey of the development of information technologies in the United States from the 1830s to the present. Students focus on the themes of the social process of invention, the federal government's role in promoting and regulating technological change, and the relationship between technological and social change in regard to the history of the telegraph, telephone, radio, television, computers, and the Internet. The themes of gender and technology and the relationship between science and technology are addressed throughout the course. Laboratory demonstrations of current research in information technology at Cornell are given in some afternoon sessions.

ENGRG 250 Technology in Society (also ECE 250, HIST 250, S&TS 250)

Fall. 3 credits. A humanities elective for engineering students. R. R. Kline.

This course investigates the history of technology in Europe and the United States from ancient times to the present. Topics include the economic and social aspects of industrialization; the myths of heroic inventors like Morse, Edison, and Ford; the government's regulation of technology, the origins of mass production; and the spread of the automobile and microelectronics cultures in the United States.

ENGRG 298 Inventing an Information Society (also ECE 298, S&TS 292, and HIST 292)

Spring. 3 credits. Approved for humanities distribution. Cannot be taken for credit after ENGRG 198/ECE 198. C. E. Seyler.

Explores the history of information technology from the 1830s to the present by considering the technical and social history of telecommunications, the electric-power industry, radio, television, computers, and the Internet. Emphasis is placed on the changing relationship between science and technology, the economic aspects of innovation, gender and technology, and other social relations of this technology.

ENGRG 323 Engineering Economics and Management (also CEE 323)

Spring, usually offered in summer for Engineering Co-op Program. 3 credits. Primarily for juniors and seniors. D. P. Loucks.

Introduction to engineering and business economics and to project management. Intended to give students a working knowledge of money management and how to make economic comparisons of alternative engineering designs or projects. The impact of inflation, taxation, depreciation, financial planning, economic optimization, project scheduling, and legal and regulatory issues are introduced and applied to economic investment and project-management problems.

ENGRG 461 Entrepreneurship For Engineers (also M&AE 461)

Fall. 3 credits. Enrollment open to upper class engineers; others with permission of instructor.

For description, see M&AE 461.

ENGRG 501 Bioengineering Seminar

Fall, spring. 1 credit. For juniors, seniors, and graduate students only. K. H. Lee.

Broad survey of all aspects of bioengineering, including biomedical, bioprocess, biological, and bioenvironmental engineering and aspects of biotechnology. Sessions may be technical presentations or discussions. Sessions may occasionally be held outside of scheduled times.

ENGRG 605 Fundamentals of Biomedical Engineering I (also CHEME 605)

Fall. 1–4 credits (1 credit per section). Prerequisites: graduate standing in Engineering or Science; PHYS 213 and MATH 294 or equivalent. Undergraduates must have permission of instructor. S-U grades optional for students not majoring or minoring in biomedical engineering. Coordinator: M. L. Shuler.

A series of four-week modules on specialized topics.

605.1 Cellular Dynamics and Cancer

1 credit. Meets first third of term. W. L. Olbricht and staff.

Basic concepts of cell biology. Mathematical models of cell cycle, receptor-mediated signaling, and cell adhesion. Conceptual approaches for engineering solutions to cancer.

605.2 Physiological Systems

1 credit. Meets second third of term. W. L. Olbricht.

Emphasis is on development of physiologically-based pharmacokinetic models for drug delivery and on models of cardiovascular system, particularly blood flow.

605.3 Biomaterials

1 credit. Meets final third of term. C. C. Chu.

The main objective of the biomaterials module is to provide students with an effective background in a wide range of biomaterials that include polymers, metals/alloys, and ceramics and that are currently used in human body repair. After completion of this module, students have the basic and some in-depth knowledge of what biomaterials are made of, how biomaterials contribute to the saving of human lives, the criteria of materials for biomedical use, biocompatibility, failure modes of biomaterials, the current R&D activities in biomaterials, challenges that

biomaterials are facing, and future direction of R&D in biomaterials.

605.4 Biomedical Engineering Project
1 credit. Meets final third of term.
M. L. Shuler.
Students work in teams on a design problem of their choice related to development of a biomedical device or procedure. Each team prepares a written report.

ENGRG 606 Fundamentals of Biomedical Engineering II (also CHEME 606)
Spring. 1–4 credits. Prerequisites: graduate standing in engineering or science; PHYS 213 and MATH 294 or equivalent. Undergraduates must have permission of instructor. S-U grades optional for students not majoring or minoring in biomedical engineering. Coordinator: M. L. Shuler.
A series of one and two-credit modules on specialized topics.

606.1 Biomedical Instrumentation and Diagnosis
Spring. 1 credit. Lec. Meeting times TBA by instructor. Preregistration with the instructor before end of fall 2001 term is required. C. D. Montemagno.
This course gives a perspective on the use of advanced instrumentation for the diagnosis and treatment of disease and the investigation of fundamental biological processes. The basic theory and application of different microscopic and spectroscopic methods, imaging tomographies, and micro-electromechanical devices to biological systems are explored. A two-day trip during spring break to Cornell University Medical Center to learn techniques of functional MRI is required.

606.2 Artificial Organs and Tissue Engineering
1 credit. Prerequisite: ENGRG 605, Section 03 (Biomaterials). Meets first third of term. W. M. Saltzman.
An introduction to the use of cells, biological molecules, and synthetic materials as the basis for building artificial organs and encouraging tissue regeneration. The section discusses the physiological and engineering issues underlying the use of synthetic, extracorporeal systems (e.g., membrane-based dialysis devices), composite implantable materials (e.g., drug-delivery systems and nerve regeneration guides), and hybrid cell/polymer implantable systems (e.g., engineered tissues).

606.3 Biomechanics of Musculoskeletal Systems
2 credits. Meets final third of term.
D. L. Bartel, C. E. Farnum.
Integrated lecture/laboratory experience. The anatomy and function of the canine hindlimb are explored in dissection laboratories and through demonstration of a non-invasive technique, computed tomography. Methods of approximating functional joint loads are discussed, and physical testing is demonstrated. A computer model of the stifle (knee) joint is created by combining knowledge of the anatomy and the mechanical environment.

ENGRG 690 Special Investigations in Bioengineering
Fall. 2 credits. Dr. Wang.
"Physics of Various Imaging Methods and Application to Medical Systems." This course introduces bioengineering students (at beginning graduate or advanced undergraduate level) to the basic principles of biomedical imaging. The materials cover the fundamental concepts and applications of major biomedical imaging modalities including computerized tomography (CT), magnetic resonance imaging (MRI), nuclear medicine, and ultrasound (US). The prerequisite for this course consists of basic physics with calculus and fourier transform skills.

Introduction to Engineering Courses

Courses in this category are freshman-level courses intended to introduce students to various aspects of engineering. They have no prerequisites and are always cross-listed with a department.

ENGRI 110 The Laser and Its Applications in Science, Technology, and Medicine (also A&EP 110)
Fall, spring. 3 credits.
The principles of laser action, types of laser systems, elements of laser design, and applications of lasers in science, technology, and medicine are discussed. In the laboratory students build and operate a nitrogen laser and a tunable dye laser. Demonstration experiments with several types of lasers illustrate phenomena such as holography, laser processing of materials, and Raman spectroscopy.

ENGRI 111 Nanotechnology
Fall. 3 credits. E. Giannelis.
Nanotechnology has been enabling the Information Revolution with the development of even-faster and more powerful devices for manipulation, storing, and transmitting information. In this hands-on course students learn how to design and manipulate materials to build devices and structures in applications ranging from computers to telecommunications to biotechnology.

ENGRI 112 Introduction to Chemical Engineering (also CHEME 112)
Fall. 3 credits. Limited to freshmen.
T. M. Duncan.
Covers design and analysis of processes involving chemical change. Students learn strategies for design, such as creative thinking, conceptual blockbusting, and (re)definition of the design goal, in the context of contemporary chemical engineering. Includes methods for analyzing designs, such as mathematical modeling, empirical analysis by graphics, and dynamic scaling through dimensional analysis, to assess product quality, economics, safety, and environmental issues.

ENGRI 113 Environmental Engineering for the Megalopolis (also CEE 113)
Fall. 3 credits. Not open (without instructor's permission) to upper-division engineering students. M. L. Weber-Shirk.
Learn how to design: reservoirs to provide water during droughts, aqueducts to transport water, water treatment plants to prevent waterborne diseases, and landfills to minimize contamination of the environment. Take field trips, build a miniature water treatment plant, and explore new technologies for making safe drinking water.

ENGRI 114 An Introduction to Electrical Circuit Engineering Design
Spring. 3 credits. C. E. Seyler.
This course introduces students to the basic principles of electric circuit analysis and design. In the laboratory students work in pairs on a focused series of electronic circuit experiments which are relevant to the course design project. A team of four to five students will then design and construct a working AM radio transmitter-receiver system.

ENGRI 115 Engineering Applications of Operations Research
Spring. 3 credits. Enrollment not open to OR&E upper-class majors.
An introduction to the problems and methods of Operations Research and Industrial Engineering focusing on problem areas (including inventory, network design, and resource allocation), the situations in which these problems can be found, and several standard solution techniques. In the computer laboratory, students encounter problem simulations and use some standard software packages.

ENGRI 116 Modern Structural Systems and Materials (also CEE 116)
Fall. 3 credits. K. C. Hover.
An introduction to the process of design, starting with assessing needs, defining performance, and evaluating materials. Discussions and exercises demonstrate how loads are carried not only through large structures, but also how those loads are carried through the micro-structure inside engineering materials. Students are introduced to the physics of structural behavior in bridges, dams, amusement park rides, Broadway and Las Vegas stage sets, and orbital structures. Here on earth students examine how loads like wind and gravity get from the structure to the ground, and how loads like earthquakes get from the ground to the structure. Materials range from traditional wood, metal, soil, rock, and concrete, to modern plastics and fiber composites.

ENGRI 117 Introduction to Mechanical Engineering (also M&AE 117)
Fall or spring, to be determined. 3 credits. Two lectures and one lab per week.
An introduction to the wide range of topics of current interest in mechanical engineering.

ENGRI 118 Design Integration: A Portable CD Player (also MS&E 118 and T&AM 118)
Spring. 3 credits. W. Sachse.
This course examines the roles of various engineering disciplines on the design of a portable compact disc (CD) player. Students are introduced to elements of mechanical, electrical, materials, environmental, manufacturing, and computer engineering as related to the CD player. Laboratory sessions and demonstrations are used to illustrate the principles of design.

ENGRI 119 Biomaterials for the Skeletal System (also MS&E 119)
Fall. 3 credits. D. T. Grubb.
Biomaterials are at the intersection of biology and engineering. This course explores natural structural materials in the human body, their properties and microstructure, and their synthetic and semi-synthetic replacements. Bones, joints, teeth, tendons, and ligaments are used as examples, with their metal, plastic, and ceramic replacements. Topics covered include strength, corrosion, toxicity, wear, and bio-compatibility. Case studies of design lead to consideration of regulatory approval requirements and legal liability issues.

ENGRI 120 Introduction to Biomedical Engineering (also CHEME 120)
Fall. 3 credits. W. M. Saltzman.
Introduction to the fundamental science and engineering that spawned the biotechnology revolution—technologies of cell cultures, DNA, and antibodies—and the relationship between biomedical science, bioengineering,

and the growing biomedical product industry. Case studies of the development of biotechnical processes, from discovery to clinical use, include processes for vaccines, antibiotics, cancer chemotherapy, protein pharmaceuticals, and organ transplantation.

ENGRI 121 Fission, Fusion, and Radiation (also A&EP 121 and NS&E 121)
Spring. 3 credits. S-U grades optional for students outside the College of Engineering. K. B. Cady.
Lecture-laboratory course on the physical nature and biological effects of nuclear radiation; benefits and hazards of nuclear energy; light-water reactors, breeder reactors, and fusion reactors; and uses of nuclear radiation in research. Laboratory demonstrations involve Cornell's research reactor; detection of nuclear radiation; activation analysis using gamma-ray spectroscopy; neutron radiography; and pulsed power generators for fusion research.

ENGRI 122 Earthquake! (also EAS 122)
Spring. 3 credits. L. D. Brown.
The science of natural hazards and strategic resources is explored. This course covers techniques for locating and characterizing earthquakes, and assessing the damage they cause; methods of using sound waves to image the earth's interior to search for strategic materials; and the historical importance of such resources. Includes seismic experiments on campus to probe for groundwater, the new critical environmental resource.

[ENGRI 124 Designing Materials for the Computer (also MS&E 124)
Spring. 3 credits. 3 lectures. Not offered spring 2002. C. K. Ober.
Introduces the materials, processes and properties of the semiconductors, polymers, ceramics, and metals used in the microelectronics industry to form integrated circuits, electronic devices, and displays. This course examines lithographic processing, metallization, diffusion, ion implantation, oxidation, and other processes used in fabricating electronic devices and their packages. The technology of displays is discussed including liquid crystal displays and light emitting devices.]

ENGRI 126 Introduction to Telecommunications
Fall. 3 credits. S. B. Wicker, staff.
This course introduces the technologies that underlie wired and wireless telecommunication systems. The course begins with an introduction to telephony and the public switched telephone network. Modems and cellular telephony are then introduced, along with ISDN and BISDN. The course concludes with an introduction to ATM and TCP/IP. The course includes both lectures and laboratory demonstrations. Students have the opportunity to design communication systems, and to determine their performance through simulations.

ENGRI 127 Introduction to Entrepreneurship and Enterprise Engineering (also M&AE 127)
Spring. 3 credits. Open to all Cornell students regardless of major; no prerequisites.
This course provides a solid introduction to the entrepreneurial process to students in engineering. The main objective is to identify and to begin to develop skills in the engineering work that occurs in high-growth, high-tech ventures. Basic engineering management issues, including the entrepreneurial perspective, opportunity recognition and evaluation, and gathering and managing resources are covered. Technical topics such as the engineering design process, product realization, and technology forecasting are discussed. This course is considered an "Introduction to Engineering" course by the College of Engineering, and satisfies the curricular requirements for such a course.

ENGRI 185 Art, Archaeology, and Analysis (also ARKEO 285, ART 372, ARTH 200, EAS 200, and PHYS 200)
Spring. 3 credits. R. Kay.
An interdepartmental course on the use of techniques of science and engineering in cultural research. Includes applications of physical and physiological principles to the study of archaeological artifacts and works of art. Also covers historical and technical aspects of artistic creation. Students learn analyses by modern methods to deduce geographical origins, and for exploration, dating, and authentication of cultural objects. Does not meet liberal studies distribution requirement for Engineering.

AGRICULTURAL AND BIOLOGICAL ENGINEERING

For complete course descriptions, see the Agricultural and Biological Engineering listing in the College of Agriculture and Life Sciences section or visit the department web site, www.aben.cornell.edu.

ABEN 151 Introduction to Computing
Fall. 4 credits. Prerequisite: MATH 191 or equivalent (coregistration permissible). Each lab and recitation section limited to 22 students.

ABEN 152 Computer Applications for Engineers
Spring. 3 credits. Prequisites: ABEN 151 or equivalent, MATH 191.
Course is comprised of three one-credit modules: (1) MATLAB; (2) spreadsheets; and (3) presentation graphics.

ABEN 200 The ABEN Experience
Spring. 1 credit.

ABEN 250 Engineering Applications in Biological Systems (also ENGRD 250)
Fall. 3 credits. Corequisite: MATH 293. Recommended for the sophomore year.
For description, see ENGRD 250.

ABEN 299 Sustainable Development: A Web-Based Course
Spring. 3 credits. Prerequisite: sophomore standing and above. S-U grades optional.

ABEN 301 Energy Systems
Spring. 3 credits. Prerequisite: college physics.

ABEN 350 Biological and Environmental Transport Processes
Fall. 3 credits. Prerequisites: MATH 294 and fluid mechanics (coregistration permissible).

ABEN 365 Properties of Biological Materials
Spring. 3 credits. Prerequisites: ENGRD 202 (coregistration permissible).

ABEN 371 Hydrology and the Environment
Spring. 3 credits. Prerequisite: 1 course in calculus.

[ABEN 411 Biomass Processing: Modelling and Analysis
Spring. 3 credits. Prerequisites: ABEN 250, ABEN 350 (or any course in heat and mass transport), BIOBM 331, 332, or BIOMI 290. Not offered 2001–2002.]

ABEN 425 Science and Technology of Environmental Management
Fall. 3 credits. Open to seniors and graduate students only. Letter grades only.

ABEN 427 Water Sampling and Measurement
Fall. 3 credits. Prerequisites: soils and/or fluids or hydrology courses and MATH 191.

ABEN 435 Principles of Aquaculture
Spring. 3 credits. Prerequisite: minimum junior standing.

ABEN 436 Aquaculture Using Recirculating Water Reuse Technology
Spring. 1 credit. Prerequisite: ABEN 435 (co-registration permissable).

ABEN 450 Bioinstrumentation
Spring. 4 credits. Prerequisites: linear differential equations, physics or electrical science, computer programming, and use of spreadsheets.

ABEN 453 Computer-Aided Engineering: Applications to Biomedical and Food Processes (also M&AE 453)
Spring. 3 credits. Prerequisite: computer programming (ABEN 151 or COM S 100) and heat and mass transfer (ABEN 350 or equivalent).

ABEN 454 Physiological Engineering
Fall. 3 credits. Corequisite: fluid mechanics.

ABEN 456 Biomechanics of Plants (also BIO PL 456)
Fall. 3 credits. Prerequisites: upper division undergraduate or graduate status, completion of introductory sequence in biology, and 1 year of calculus, or permission of instructor. S-U grades optional.

ABEN 458 Introduction to Biotechnology
Fall. 4 credits. Prerequisites: ABEN 350 (coregistration permissible), biochemistry, microbiology, fluid mechanics, or permission of instructor.

ABEN 471 Geohydrology (also CEE 431 and GEOL/EAS 445)
Fall. 3 credits. Prerequisites: MATH 294 and ENGRD 202.
For description, see CEE 431.

ABEN 473 Watershed Engineering
Fall. 3 credits. Prerequisite: fluid mechanics or hydrology.

ABEN 474 Drainage and Irrigation Design
Spring. 3 credits. Prerequisites: fluid mechanics or hydrology.

ABEN 475 Environmental Systems Analysis
Fall, spring. 3 credits. Prerequisites: MATLAB and 2 years of calculus. Will not be offered fall 2001 but will be offered spring 2002.

ABEN 476 Solid Waste Engineering
Spring. 3 credits. Prerequisites: 1 semester of physics and chemistry.

ABEN 478 Ecological Engineering
Spring. 3 credits. Prerequisite: junior-level environmental quality engineering course or equivalent.

ABEN 481 LRFD-Based Engineering of Wood Structures (also CEE 481)
Spring. 3 credits. Prerequisite: ENGRD 202.

ABEN 482 Biothermal Engineering
Spring. 3 credits. Prerequisites: ABEN 250 and 350, or equivalent.

ABEN 489 Engineering Entrepreneurship, Management and Ethics
Spring. 3 credits. Prerequisites: ENGRD 270 or CEE 304 or equivalent, junior standing.

ABEN 493 Technical Writing for Engineers
Fall. 1 credit. Prerequisites: ABEN 473.

ABEN 494 Special Topics in Agricultural and Biological Engineering
Fall, spring. 1–4 credits. S-U grades optional.

ABEN 495 ABEN Honors Research
Fall, spring. 1–6 credits. Prerequisites: enrollment in the ABEN Honors Research Program.

ABEN 496 Capstone Design in Agricultural and Geological Engineering
Fall, spring. 1–3 credits. Prerequisite: senior standing in ABEN engineering program or permission of instructor. Completed independent study form (available in 140 Roberts Hall) is required to register.

ABEN 497 Individual Study in Agricultural and Biological Engineering
Fall, spring. 1–4 credits. Prerequisite: written permission of instructor and adequate ability and training for the work proposed. Normally reserved for seniors in upper two-fifths of their class. S-U grades optional. Completed independent study form (available in 140 Roberts Hall) is required to register.

ABEN 498 Undergraduate Teaching
Fall, spring. 1–4 credits. Prerequisite: written permission of instructor. Completed independent study form (available in 140 Roberts Hall) is required to register.

ABEN 499 Undergraduate Research
Fall, spring. 1–3 credits. Prerequisites: written permission of instructor; adequate training for work proposed. Normally reserved for seniors in upper two-fifths of their class. Completed independent study form (available in 140 Roberts Hall) is required to register.

ABEN 551/552 Agricultural and Biological Engineering Design Project
Fall, 551; spring, 552. 3–6 credits. Prerequisite: admission to the M.Eng. (Agricultural and Biological) degree program.

ABEN 651 Bioremediation: Engineering Organisms to Clean Up the Environment
Spring. 3 credits. Prerequisites: BIOMI 290 or BIOMI 398 or BIOMI 331 or permission of instructor.

ABEN 652 Instrumentation: Sensors and Transducers
Spring. 3 credits. Prerequisites: linear differential equations, introductory chemistry and introductory physics, or permission of instructor.

[ABEN 655 Thermodynamics and Its Applications
Spring. 3 credits. Prerequisite: MATH 293 or equivalent. Not offered 2001–2002.]

ABEN 658 Biosensors and Bioanalytical Techniques
Spring. 4 credits. Prerequisites: biochemistry and permission of instructor.

[ABEN 671 Analysis of the Flow of Water and Chemicals in Soils
Fall. 3 credits. Prerequisites: 4 calculus courses and fluid mechanics. Not offered 2001–2002.]

ABEN 672 Drainage
Spring. 4 credits. Prerequisites: ABEN 471 or ABEN 473. S-U grades optional.

ABEN 673 Sustainable Development Seminar (also NBA 573)
Spring. 1–3 credits. Prerequisite: upper division undergraduate and graduate students or permission of instructor.

ABEN 678 Nonpoint Source Models
Spring. 3 credits. Prerequisites: computer programming and calculus.

ABEN 685 Biological Engineering Analysis
Spring. 4 credits. Prerequisite: T&AM 310 or permission of instructor.

ABEN 694 Graduate Special Topics in Agricultural and Biological Engineering
Fall, spring. 1–4 credits. S-U grades optional.

ABEN 697 Graduate Individual Study in Agricultural and Biological Engineering
Fall, spring. 1–6 credits. Prerequisite: permission of instructor. S-U grades optional.

ABEN 700 General Seminar
Fall. 1 credit. S-U grades only.

ABEN 750 Orientation to Graduate Study
Fall. 1 credit. S-U grades only. Limited to newly joining graduate students.

ABEN 754 Watershed Management
Spring. 2–3 credits. Prerequisite: graduate standing or permission of instructor.

ABEN 771 Soil and Water Engineering Seminar
Fall, spring. 1–3 credits. Prerequisite: graduate status or permission of instructor. S-U grades optional.

ABEN 781 Structures and Related Topics Seminar
Spring. 1 credit. Prerequisite: graduate status or permission of instructor. S-U grades only.

ABEN 785 Biological Engineering Seminar
Spring. 1 credit. Prerequisite: graduate status or permission of instructor. S-U grades only.

ABEN 800 Master's-Level Thesis Research
Fall, spring. 1–15 credits. Prerequisite: permission of adviser. S-U grades only.

ABEN 900 Graduate-Level Thesis Research
Fall, spring. 1–15 credits. Prerequisite: permission of adviser. S-U grades only. Variable credit for Ph.D. research before the "A" exam is passed.

ABEN 901 Doctoral-Level Thesis Research
Fall, spring. 1–15 credits. Prerequisite: passing of Admission Candidacy Exam and permission of adviser. S-U grades only.

APPLIED AND ENGINEERING PHYSICS

A&EP 110 The Laser and Its Applications in Science, Technology, and Medicine (also ENGRI 110)
Fall, spring. 3 credits.
This is a course in the Introduction to Engineering series. For description, see ENGRI 110.

A&EP 121 Fission, Fusion, and Radiation (also ENGRI 121 and NS&E 121)
Spring. 3 credits. S-U grades optional for students outside the College of Engineering. K. B. Cady.
This is a course in the Introduction to Engineering series. For description, see ENGRI 121.

A&EP 217 Electricity and Magnetism (also PHYS 217)
Fall, spring. 4 credits. Prerequisites: approval of student's adviser and permission of the instructor; coregistration in PHYS 216 or knowledge of special relativity at the level of PHYS 116; MATH 192 or equivalent and coregistration in MATH 293 or equivalent. Staff.
Intended for students who have done well in PHYS 112 or 116 (or the equivalent) and in mathematics who desire a more analytic treatment than that of PHYS 213. At the level of *Electricity and Magnetism*, by Purcell. Recommended for prospective engineering physics majors. A placement quiz may be given early in the semester, permitting those students who find the material too abstract or analytical to transfer into PHYS 213 without difficulty.

AEP 252 The Physics of Life (also ENGRD 252)
Fall. Prerequisites: Math 192, Chem 207 or 211, and co-registration in or completion of Phys 213.
This course introduces the physics of biological macromolecules (e.g. proteins, DNA, RNA) to students of the physical sciences or engineering who have little or no background in biology. The macromolecules are studied from three perspectives. First, the biological role or function of each class of macromolecules is considered. Second, a quantitative description of the physical interactions that determine the behavior of these systems is provided. Finally, techniques

that are commonly used to probe these systems, with an emphasis on current research, are discussed.

A&EP 264 Computer-Instrumentation Design (also ENGRD 264)
Fall, spring. 3 credits. Prerequisites: COM S 100. 1 lec, 1 lab.
For description, see ENGRD 264.

A&EP 321 Mathematical Physics I
Fall, summer. 4 credits. Prerequisite: MATH 294. Intended for upper-level undergraduates in the physical sciences.
Review of vector analysis; complex variable theory, Cauchy-Rieman conditions, complex Taylor and Laurent series, Cauchy integral formula and residue techniques, conformal mapping; Fourier Series; Fourier and Laplace transforms; ordinary differential equations; separation of variables. Texts: *Mathematical Methods for Physicists*, by Arfken; *Mathematical Physics*, by Butkov.

A&EP 322 Mathematical Physics II
Spring. 4 credits. Prerequisite: A&EP 321. Second of the 2-course sequence in mathematical physics intended for upper-level undergraduates in the physical sciences.
Topics: partial differential equations, Bessel functions, spherical harmonics, separation of variables, wave and diffusion equations, Laplace, Helmholtz, and Poisson's Equations, transform techniques, Green's functions; integral equations, Fredholm equations, kernals; complex variables, theory, branch points and cuts, Riemann sheets, method of steepest descent; tensors, contravariant, and covariant representations; group theory, matrix representations, class and character. Texts: *Mathematical Methods for Physicists*, by Arfken; *Mathematical Physics*, by Butkov.

A&EP 330 Modern Experimental Optics (see also PHYS 330)
Fall. 4 credits. Enrollment limited.
Prerequisites: PHYS 214 or equivalent.
E. Bodenschatz.
A practical laboratory course in basic and modern optics. The various projects cover a wide range of topics from geometrical optics to classical wave properties such as interference, diffraction, and polarization. Each experimental setup is equipped with standard, off-the-shelf optics and opto-mechanical components to provide the students with hands-on experience in practical laboratory techniques currently employed in physics, chemistry, biology, and engineering. Students are also introduced to digital imaging and image processing techniques.

A&EP 333 Mechanics of Particles and Solid Bodies
Fall, summer. 4 credits. Prerequisites: PHYS 112 or 116 and coregistration in A&EP 321 or equivalent or permission of instructor.
This course covers: Newton's mechanics; constants of the motion; many-body systems; linear oscillations; variational calculus; Lagrangian and Hamiltonian formalism for generalized coordinates; non-inertial reference systems; central-force motion; motion of rigid bodies; small vibrations in multi-mass systems; nonlinear oscillations; and basic introduction to relativistic mechanics. Emphasis is on mathematical treatments, physical concepts, and applications. (On the level of *Classical Dynamics*, by Marion and Thorton).

A&EP 355 Intermediate Electromagnetism
Fall, summer. 4 credits. Prerequisites: PHYS 214 or 217 and coregistration in A&EP 321 or equivalent, or permission of instructor.
Topics: vector calculus, electrostatics, analytic and numerical solutions to Laplace's equation in various geometries, electric and magnetic multipoles, electric and magnetic materials, energy in fields, quasistatics, and magnetic circuit design. Emphasis is on developing proficiency with analyical and numerical solution techniques in order to solve real-world design problems.

A&EP 356 Intermediate Electrodynamics
Spring. 4 credits. Prerequisite: A&EP 355 and coregistration in A&EP 322 or equivalent, or permission of instructor.
Topics: electromagnetic waves, waveguides, transmission lines, dispersive media, radiation, special relativity, interference phenomena. Emphasis is on physical concepts and developing ability to design/analyze microwave circuits and antenna arrays.

A&EP 361 Introductory Quantum Mechanics
Spring. 4 credits. Prerequisites: A&EP 333 or PHYS 318; coregistration in A&EP 322 or equivalent and in A&EP 356 or PHYS 326.
A first course in the systematic theory of quantum phenomena. Topics include wave mechanics, the Dirac formalism, angular momentum, the hydrogen atom, and perturbation theory.

A&EP 363 Electronic Circuits (also PHYS 360)
Fall, spring. 4 credits. Prerequisites: PHYS 208 or 213 or permission of the instructor. No previous experience with electronics assumed; however, the course moves quickly through some introductory topics such as basic DC circuits. Fall term usually less crowded. 1 lec, 2 labs. Fall: E. Kirkland; spring: J. Alexander.
Analyze, design, build and experimentally test circuits used in scientific and engineering instrumentation (with discrete components and integrated circuits). Analog circuits: resistors, capacitors, operational amplifiers (linear amplifiers with feedback, oscillators, comparators), filters, diodes and transistors. Digital circuits: combinatorial (gates) and sequential (flip-flops, counters, shift registers) logic. Computer interfacing introduced and used to investigate digital to analog (DAC) and analog to digital conversion (ADC) and signal averaging.

A&EP 403 Introduction to Nuclear Science and Engineering (also ECE 403, M&AE 458, and NS&E 403)
Fall. 3 credits. Prerequisite: PHYS 214 and MATH 294.
For description see NS&E 403.

A&EP 423 Statistical Thermodynamics
Fall. 4 credits. Prerequisite: introductory 3-semester physics sequence plus 1 year of junior-level mathematics.
Quantum statistical basis for equilibrium thermodynamics, microcanonical, canonical and grand canonical ensembles, and partition functions. Classical and quantum ideal gases, paramagnetic and multiple-state systems. Maxwell-Boltzmann, Fermi-Dirac, and Bose-Einstein statistics and applications. Introduction to systems of interacting particles. At the level of *Thermal Physics*, by Kittel and Kroemer, and *Statistical Physics*, by Rosser.

A&EP 434 Continuum Physics
Spring. 4 credits. Prerequisites: A&EP 333 and 356 or equivalent.
Topics: Elasticity and Fluid Mechanics: basic phenomena of elasticity, simple beams, stress and strain tensors, materials equations, equations of motion, general beam equations, waves; fluids: basic phenomena, Navier Stokes equation, scaling laws, Reynolds and Froude numbers, Poisseuille flows, Stokes drag on sphere, boundary layers, invicid and incompressible flows, potential flow, conservation laws, Bernoulli equation, vorticity and circulation, life of wings, jets, instabilities, introduction to turbulence. Projects in combination with AEP 438 possible. At the level of Lai, Rubin and Krempl, *Continuum Mechanics*, and Tritton, *Introduction to Fluid Mechanics*.

A&EP 438 Computational Engineering Physics
Spring. 3 credits. Prerequisites: COM S 100, A&EP 321, 333, 355, 361, or equivalent, or permission of instructor; coregistration in 361 permitted.
Numerical computation (derivatives, integrals, differential equations, matrices, boundary-value problems, relaxation, Monte Carlo methods, etc.) is introduced and applied to engineering physics problems that cannot by solved analytically (three-body problem, electrostatic fields, quantum energy levels, etc.). Computer programming required (in C or optionally C++, FORTRAN, or Pascal). Some prior exposure to programming assumed but no previous experience with C assumed.

A&EP 440 Quantum and Nonlinear Optics
Spring. 4 credits. Prerequisites: A&EP 356, A&EP 361, or equivalent.
An introduction to the fundamentals of the interaction of laser light with matter. Topics include the propagation of laser beams in bulk media and guided-wave structures, the origins of optical nonlinearities, harmonic generation, self-focusing, optical bistability, propagation of ultrashort pulses, solitons, optical phase conjugation, optical resonance and two-level atoms, atom cooling and trapping, multiphoton processes, spontaneous and simulated scattering, and ultra-intense laser-matter interactions.

A&EP 450 Introductory Solid State Physics (also PHYS 454)
Fall. 4 credits. Prerequisites: some exposure to quantum mechanics at the level of PHYS 443, A&EP 361, or CHEM 793 is highly desirable but not absolutely required.
An introduction to the physics of crystalline solids. Covers crystal structures; electronic states; lattice vibrations; and metals, insulators, and semiconductors. Computer simulations of the dynamics of electrons and ions in solids. Optical properties, magnetism, and superconductivity are covered as time allows. The majority of the course addresses the foundations of the subject, but time is devoted to modern and/or technologically important topics such as quantum size effects. At the level of *Introduction to Solid State Physics* by Kittel, or *Solid State Physics* by Ashcroft and Mermun.

A&EP 470 Biophysical Methods (also BIONB 470)
Spring. 3 credits. Prerequisites: solid knowledge of basic physics and mathematics through the sophomore level; some knowledge of cellular biology helpful but not required. Letter grades only.
An overview of the diversity of modern biophysical experimental techniques used in the study of biophysical systems at the cellular and molecular level. Topics covered include methods that examine both structure and function of biological systems, with emphasis on the applications of these methods to biological membranes. The course format includes assigned literature reviews by the students on specific biophysics topics and individual student presentations on these topics. The course is intended for students of the engineering, physics, chemistry, and biological disciplines who seek an introduction to modern biophysical experimental methods.

A&EP 484 Introduction to Controlled Fusion: Principles and Technology (also ECE 484, M&AE 459, and NS&E 484)
Spring. 3 credits. Prerequisites: PHYS 112, 213, and 214, or equivalent background in electricity and magnetism and mechanics; and permission of instructor. Intended for seniors and graduate students. Offered on demand.
For description, see NS&E 484.

A&EP 490 Independent Study in Engineering Physics
Fall, spring. Credit TBA.
Laboratory or theoretical work in any branch of engineering physics under the direction of a member of the faculty. The study can take a number of forms; for example, design of laboratory apparatus, performance of laboratory measurements, computer simulation or software developments, theoretical design and analysis. Details TBA with respective faculty member.

A&EP 550 Applied Solid State Physics
Spring. 3 credits. Prerequisites: A&EP 356, 361, 423, 450 (or equivalent).
Directed at students who have had an introductory course in solid state physics at the level of Kittel. This course concentrates on the application of the quantum mechanical theory of solid state physics to semiconductor materials, solid state electronic devices, solid state detectors and generators of electromagnetic radiation, superconducting devices and materials, the nonlinear optical properties of solids, ferromagnetic materials, nanoscale devices, and mesoscopic quantum mechanical effects. The course stresses the basic, fundamental physics underlying the applications rather than the applications themselves. At the level of *Introduction to Applied Solid State Physics* by Dalven.

A&EP 606 Introduction to Plasma Physics (also ECE 581)
Fall. 4 credits. Prerequisites: ECE 303 or equivalent. First-year graduate-level course; open to exceptional seniors.
For description, see ECE 581.

A&EP 607 Advanced Plasma Physics (also ECE 582)
Spring. 4 credits. Prerequisites: ECE 581 and A&EP 606. Offered on demand.
For description, see ECE 582.

A&EP 633 Nuclear Reactor Engineering (also NS&E 633)
Fall. 4 credits. Prerequisite: introductory course in nuclear engineering. Offered on demand. K. B. Cady.
For description, see NS&E 633.

A&EP 661 Microcharacterization
Fall. 3 credits. Prerequisites: introductory 3-semester physics sequence or an introductory course in modern physics. At the senior/first-year graduate level.
The basic physical principles underlying the many modern microanalytical techniques available for characterizing materials from volumes less than a cubic micron. Discussion centers on the physics of the interaction process by which the characterization is performed, the methodology used in performing the characterization, the advantages and limitations of each technique, and the instrumentation involved in each characterization method.

A&EP 662 Micro/Nano-fabrication and Processing
Spring. 3 credits.
An introduction to the fundamentals of micro and nano-fabricating and patterning thin-film materials and surfaces, with emphasis on electronic and optical materials, micromechanics, and other applications. Vacuum and plasma thin-film deposition processes. Photon, electron, X-ray, and ion-beam lithography. Techniques for pattern replication by plasma and ion processes. Emphasis is on understanding the physics and materials science that define and limit the various processes. At the level of Brodie and Muray.

A&EP 663 Nanobiotechnology (also BIO G 663 and MS&E 563)
Spring. 3 credits. Letter grade only. C. Batt and H. Craighead.
A graduate-level course that covers the basics of biology and the principles and practice of microfabrication techniques. The course focuses on applications in biomedical and biological research. A team design project that stresses interdisciplinary communication and problem solving is one of the course requirements. The course is held twice weekly with 75-minute classes. All lectures are teleconferenced to our NBTC associate institutes.

A&EP 711 Principles of Diffraction (also MS&E 671)
Spring. 3 credits. Letter grades only. J. D. Brock.
This course is a graduate-level introduction to diffraction/scattering phenomena in the context of solid-state and soft condensed-matter systems. The primary topic is using the scattering and absorption of neutron, electron, and X-ray beams to study physical systems. Particular emphasis is placed on issues related to synchrotron X-ray sources. Specific topics that are covered in the course include: elastic and inelastic scattering; diffraction from two- and three-dimensional periodic lattices; the Fourier representation of scattering centers and the effects of thermal vibrations and disorder; diffraction, reflectivity, or scattering from surface layers; diffraction or scattering from gases and amorphous materials; small angle scattering; X-ray absorption spectroscopy; resonant (e.g., magnetic) scattering; novel techniques using coherent X-ray beams; and a survey of dynamical diffraction from perfect and imperfect lattices.

A&EP 751 M ENG Project
Fall, spring. 6–12 credits TBA. Required for candidates for the M.Eng. (Engineering Physics) degree.
Independent study under the direction of a member of the university faculty. Students participate in an independent research project through work on a special problem related to their field of interest. A formal and complete research report is required.

A&EP 753 Special Topics Seminar in Applied Physics
Fall. 1 credit. Prerequisite: undergraduate physics. Required for candidates for the M.Eng. (Engineering Physics) degree and recommended for seniors in engineering physics.
Special topics in applied science, with focus on areas of applied physics and engineering that are of current interest. Subjects chosen are researched in the library and presented in a seminar format by the students. Effort is made to integrate the subjects within selected subject areas such as atomic, biological, computational, optical, plasma, and solid-state physics, or microfabrication technology, as suggested by the students and coordinated by the instructor.

CHEMICAL ENGINEERING

CHEME 112 Introduction to Chemical Engineering (also ENGRI 112)
Fall. 3 credits. Limited to freshmen. T. M. Duncan.
This is a course in the Introduction to Engineering series. For description, see ENGRI 112.

CHEME 120 Introduction to Biomedical Engineering (also ENGRI 120)
Fall. 3 credits. W. M. Saltzman.
This is a course in the Introduction to Engineering series. For description, see ENGRI 120.

CHEME 219 Mass and Energy Balances (also ENGRD 219)
Fall. 3 credits. Corequisite: physical or organic chemistry or permission of instructor. K. H. Lee.
For description, see ENGRD 219.

CHEME 301 Nonresident Lectures
Spring. 1 credit. M. Ackley.
Lecturers from industry and from selected departments of the university provide information to assist students in their post-graduate plans.

CHEME 313 Chemical Engineering Thermodynamics
Fall. 4 credits. Corequisite: physical chemistry. F. A. Escobedo.
A study of the first and second laws and their consequences for chemical systems. Thermodynamic properties of pures fluids, solids, and mixtures; phase and chemical reaction equilibrium; heat effects in batch and flow processes; and power cycles and refrigeration.

CHEME 323 Fluid Mechanics
Fall. 3 credits. Prerequisites: CHEME 219 and engineering mathematics sequence. W. L. Olbricht.
Fundamentals of fluid mechanics. Macroscopic and microscopic balances. Applications to problems involving viscous flow.

CHEME 324 Heat and Mass Transfer
Spring. 3 credits. Prerequisite: CHEME 323. C. Cohen.
Fundamentals of heat and mass transfer. Macroscopic and microscopic balances. Applications to problems involving conduction, convection, and diffusion.

CHEME 332 Analysis of Separation Processes
Spring. 3 credits. Prerequisites: CHEME 313 and 323. P. Clancy.
Analysis of separation processes involving phase equilibria and mass transfer. Covers: phase equilibria; binary and multicomponent distillation; liquid-liquid extraction; gas absorption, absorption, membrane separations.

CHEME 372 Introduction to Process Dynamics and Control
Spring. 1 credit. Prerequisites: CHEME 313 and 323. A. B. Anton
Modeling and analysis of the dynamics of chemical processes, Laplace transforms, block diagrams, feedback control systems, and stability analysis.

CHEME 390 Reaction Kinetics and Reactor Design
Spring. 3 credits. Prerequisites: CHEME 313 and 323. J. R. Engstrom.
A study of chemical reaction kinetics and principles of reactor design for chemical processes.

CHEME 391 Physical Chemistry II (also CHEM 391)
Spring. 4 credits. Limited to engineering students. T. M. Duncan.
For description, see CHEM 391.

CHEME 432 Chemical Engineering Laboratory
Fall. 4 credits. Prerequisites: CHEME 323, 324, 332, and 390. K. E. Ackley and staff.
Laboratory experiments in fluid dynamics, heat and mass transfer, kinetics, other operations. Correlation and interpretation of data. Technical report writing.

CHEME 462 Chemical Process Design
Spring. 4 credits. Prerequisite: CHEME 432. K. E. Ackley and staff.
A consideration of process and economic alternatives in selected chemical processes; design and assessment.

CHEME 472 Feedback Control Systems (also ECE 471 and M&AE 478)
Fall. 4 credits. Prerequisites: CHEME 372, ECE 301, M&AE 326, or permission of instructor. A. B. Anton and R. D'Andrea.
For description, see M&AE 478.

[CHEME 480 Chemical Processing of Electronic Materials
Spring. 3 credits. Not offered 2001–2002. A. B. Anton.
Introduction to chemical processing of semiconductor materials for the manufacture of microelectronic devices, with specific emphasis on thermodynamics, transport phenomena, and kinetics. Topics include semiconductor properties and behavior, microelectronic device operation, thermochemistry of deposition and etching reactions, vacuum transport, plasmas, PVD, oxidation, diffusion, CVD, and statistical process control.]

CHEME 481 Biomedical Engineering
Spring. 3 credits. Prerequisite: CHEME 324 or equivalent or permission of instructor. W. M. Saltzman.
Special topics in biomedical engineering, including cell separations, blood flow, design of artificial devices, biomaterials, image analysis, biological transport phenomena, pharmacokinetics and drug delivery, biomedical transducers (ECG and pace makers), and analysis of physiological processes such as adhesion, mobility, secretion, and growth.

CHEME 490 Undergraduate Projects in Chemical Engineering
Fall, spring. Variable credit.
Research or studies on special problems in chemical engineering.

CHEME 491 Undergraduate Teaching in Chemical Engineering
Fall. 1 credit. T. M. Duncan and M. Ackley.
Methods of instruction in chemical engineering acquired through discussions with faculty and by assisting with the instruction of freshmen and sophomores.

CHEME 520 Chemical, Polymer, Biomedical, and Electronic Materials Processing
Fall, spring. 1–6 credits (1 credit per section).

520.1 An Overview of Chemical Processing
Spring. 1 credit. Meets first third of term. Limited to non-chemical engineers. T. M. Duncan.
An introduction to chemical engineering design and analysis-mathematical modeling, graphical methods and dynamic scaling. Open to nonchemical engineers only.

520.2 Introduction to Biomedical Engineering
Spring. 1 credit. Meets first third of term. W. M. Saltzman.
Meets concurrently with CHEME 481.

520.3 Introduction to Electronic Materials Processing
Spring. 1 credit. Meets first third of term. A. B. Anton.
Meets concurrently with CHEME 480.

520.4 Introduction to Polymer Processing
Spring. 1 credit. Meets final third of term. C. Cohen.
Overview and simple quantitative analyses of several plastic processes with an emphasis on the role of rheology in polymer processing.

520.5 Chemical Engineering Processing Units and Equipment
Spring. 1 credit. Meets second third of term. K. E. Ackley and A. M. Center.
A hands-on survey of standard chemical processing equipment-structure and operation—with emphasis on trouble-shooting techniques.

520.6 Petroleum Refining
Spring. 1 credit. Meets final third of term. A. M. Center.
The technical and business aspects of petroleum refining. Applications of chemical engineering principles for practical solutions to business needs.

520.7 Process Control Strategies
Fall. 1 credit. Meets second third of term. A. M. Center.
Analysis of multiple interacting dynamic systems in chemical processes. Measurement of process variables, examples of measurement and control applications, and determining optimal monitoring and control strategy.

CHEME 562 Managing Chemical Process Design
Spring. 1 or 2 credits. Prerequisite: CHEME 462. K. E. Ackley.
Guidance and evaluation of chemical process designs developed by teams of chemical engineers.

[CHEME 564 Design of Chemical Reactors
Spring. 3 credits. Prerequisite: CHEME 390 or equivalent. Offered alternate years; not offered 2001–2002. P. Harriott.
Design, scale-up, and optimization of chemical reactors with allowance for heat and mass transfer and nonideal flow patterns. Homework problems feature analysis of published data for gas-solid, gas-liquid, and three-phase reaction systems.]

CHEME 565 Design Project
Fall, spring. 3 or 6 credits. Required for students in the M.Eng. (Chemical) program.
Design study and economic evaluation of a chemical processing facility, alternative methods of manufacture, raw-material preparation, food processing, waste disposal, or some other aspect of chemical processing.

CHEME 572 Managing Business Development Solutions
Fall. 3 credits. Prerequisites: graduate standing; undergraduates must have permission of instructor. A. M. Center.
A case study approach introduces the typical fundamental factors driving a business venture, examines how to develop implementation strategies for the venture, and teaches the project management skills necessary to successfully implement the venture.

CHEME 590 Special Projects in Chemical Engineering
Fall, spring. Variable credit. Limited to graduate students.
Non-thesis research or studies on special problems in chemical engineering.

CHEME 596 Systems on a Chip (also ECE 596, MS&E 594)
Fall. 3 credits. P. Clancy, M. L. Shuler, M. Thompson, G. Malliaras, E. Kan.
Fundamentals of electronic chip fabrication processes for systems on a chip, the complexities of building devices on dissimilar substrates (e.g. Si on plastics), the creation of organic optoelectronic devices, and functional design integration issues. Applications to lab on a chip systems. Group design project required.

CHEME 605 Fundamentals in Biomedical Engineering I (also ENGRG 605)
Fall. 1–4 credits (1 credit per section). Prerequisites: graduate standing in Engineering or Science; PHYS 213 and MATH 294 or equivalent. Undergraduates must have permission of instructor and have completed ABEN 454, CHEME 481, or M&AE 465. S-U grades optional for students not majoring or minoring in biomedical engineering.
For description, see ENGRG 605.

CHEME 606 Fundamentals in Biomedical Engineering II (also ENGRG 606)
Spring. 1–4 credits. Prerequisites: graduate standing in engineering or science; PHYS 213 and MATH 294 or equivalent. Undergraduates must have permission of instructor and have completed ABEN 454, CHEME 481, or M&AE 465. S-U grades

optional for students not majoring or minoring in biomedical engineering.
For description, see ENGRG 606.

CHEME 640 Polymeric Materials
Fall. 3 credits. F. Rodriguez.
Chemistry and physics of the formation and characterization of polymers. Principles of fabrication.

CHEME 643 Introduction to Bioprocess Engineering
Fall. 3 credits. Prerequisite: CHEME 390 or permission of instructor. No prior background in the biological sciences required. M. L. Shuler.
A discussion of principles involved in using microorganisms, tissue cultures, and enzymes for processing. Application to food, fermentation, and pharmaceutical industries and to biological waste treatment.

CHEME 656 Separations Using Membranes or Porous Solids
Spring. 3 credits. Prerequisites: CHEME 324 and 332. Offered alternate years; not offered 2002–2003.
Diffusion of small molecules in gases, liquids, and solids. Membrane separation processes including gas separation, pervaporation, reverse osmosis, and ultrafiltration. Purification of gases and liquids by adsorption, ion exchange, and chromatography.

CHEME 661 Air Pollution Control
Spring. 3 credits.
Origin of air pollutants, U.S. emission standards, dispersion equations. Design of equipment for removal of particulate and gaseous pollutants formed in combustion and chemical processing.

CHEME 675 Synthetic Polymer Chemistry (also MS&E 622 and CHEM 671)
Fall. 4 credits. Prerequisites: CHEM 359–360 or equivalent or permission of instructor.
For description, see CHEM 671.

CHEME 711 Advanced Chemical Engineering Thermodynamics
Fall. 3 credits. Prerequisite: CHEME 313 or equivalent.
Postulatory approach to thermodynamics. Legendre transformations. Equilibrium and stability of general thermodynamic systems. Applications of thermodynamic methods to advanced problems in chemical engineering. Introduction to statistical mechanical ensembles, phase transitions, Monte Carlo methods, and theory of liquids.

CHEME 713 Chemical Kinetics and Dynamics
Spring. 3 credits. Prerequisite: CHEME 390 or equivalent. F. Escobedo.
Topics include: microscopic and macroscopic viewpoints; connections between phenomenological chemical kinetics and molecular reaction dynamics; reaction cross sections, potential energy surfaces, and dynamics of bimolecular collisions; molecular beam scattering; transition state theory.
Unimolecular reaction dynamics; complex chemically reacting systems: reactor stability, multiple steady states, oscillations, and bifurcation; reactions in heterogeneous media; and free-radical mechanisms in combustion and pyrolysis.

CHEME 731 Advanced Fluid Mechanics and Heat Transfer
Fall. 3 credits. Prerequisites: CHEME 323 and 324 or equivalent. D. L. Koch.
Topics include: derivation of the equations of motion for Newtonian fluids; low Reynolds number fluid dynamics, lubrication theory, inviscid fluid dynamics; boundary layer theory; and convective and conductive heat transfer.

CHEME 732 Diffusion and Mass Transfer
Spring. 2 credits. Prerequisite: CHEME 731 or equivalent. P. H. Steen.
Conservation equations in multicomponent systems, irreversible thermodynamics, dispersion, and Brownian diffusion. Mass transfer for convective diffusion in liquids. Application to a variety of problems such as coagulation of aerosols, diffusion through films and membranes, liquid-liquid extraction, chemical vapor deposition, polymer rheology and diffusion, and reaction-diffusion systems.

CHEME 741 Selected Topics in Biochemical Engineering
Fall, spring. 1 credit (may be repeated for credit). Prerequisite: permission of instructor. K. H. Lee, M. L. Shuler, and W. M. Saltzman.
Discussion of current topics and research in biochemical engineering for graduate students.

CHEME 745 Physical Polymer Science I
Fall. 3 credits. Corequisite: CHEME 711 or equivalent. Offered alternate years; not offered 2002–2003. C. Cohen.
Covers thermodynamic properties of dilute, semidilute, and concentrated solutions from both classical and scaling approaches. Also covers characterization techniques of dilute solutions: osmometry, light scattering, viscometry, and sedimentation. Covers rubber elasticity; mechanical and thermodynamic properties of gels. Includes discussion of polymer melts: equations of state and glass transition phenomena.

CHEME 751 Mathematical Methods of Chemical Engineering Analysis
Fall. 4 credits. A. B. Anton.
Application of advanced mathematical techniques to chemical engineering analysis. Mathematical modeling, scaling, regular and singular perturbations, multiple scales, asymptotic analysis, linear and nonlinear ordinary and partial differential equations, statistics, data analysis, and curve fitting.

CHEME 753 Analysis of Nonlinear Systems: Stability, Bifurcation, and Continuation
Fall. 3 credits. Prerequisite: CHEME 751 or equivalent. Offered alternate years; not offered 2002–2003. P. H. Steen.
Topics covered include: elements of stability and bifurcation theory; branch-following techniques; stability of discrete and continuous systems; and application to elasticity, reaction-diffusion, and hydrodynamic systems using software for continuation problems.

CHEME 790 Seminar
Fall, spring. 1 credit each term.
General chemical engineering seminar required of all graduate students in the field of chemical engineering.

CHEME 792 Principles and Practices of Graduate Research
Fall, spring. 1 credit. T. M. Duncan and staff.
A colloquium/discussion group series for first-year graduate students. Topics include the culture and responsibilities of graduate research and the professional community; the mechanics of conducting research (experimental design, data analysis, serendipity in research, avoiding self-deception), documenting research (lab notebooks, computer files), and reporting research (writing a technical paper and oral presentations).

CHEME 890 Thesis Research
Fall, spring. Variable credit.
Thesis research for the M.S. degree in chemical engineering.

CHEME 990 Thesis Research
Fall, spring. Variable credit.
Thesis research for the Ph.D. degree in chemical engineering.

CIVIL AND ENVIRONMENTAL ENGINEERING

Courses in the School of Civil and Environmental Engineering are offered in three broad mission areas: Civil Infrastructure, Environment, and Systems Engineering and Information Technology. Within each mission area are several areas of specialization. The following are the course numbers and titles listed by specialization within each mission area. Some courses are listed in two or more mission areas because the course content is relevant to multiple areas. The school also offers a number of general courses that are not unique to one mission area. Full course descriptions follow in the subsequent section and are listed in numerical order.

General

CEE 113 Environmental Engineering for the Megalopolis (also ENGRI 113) (F,3cr.)

CEE 116 Modern Structural Systems and Materials (also ENGRI 116) (F,3cr.)

CEE 241 Engineering Computation (also ENGRD 241) (F,S,3cr.)

CEE 304 Uncertainty Analysis in Engineering (F,4cr.)

CEE 308 Introduction to CADD (F,S,1cr.)

CEE 309 Special Topics in Civil and Environmental Engineering (F,S,var.)

CEE 323 Engineering Economics and Management (also ENGRG 323) (S,Su,3cr.)

CEE 400 Senior Honors Thesis (F,S,var.)

CEE 401 Undergraduate Engineering Teaching in CEE (F,S,var.)

Civil Infrastructure

See also: CEE 116, CEE 241, CEE 304, CEE 308, CEE 503, and CEE 595

Geotechnical Engineering

CEE 341 Introduction to Geotechnical Engineering and Analysis (S,4cr.)

CEE 501/502 Design Project in Geotech/Structures (F,S,3cr.)

CEE 602 Civil Infrastructure Seminar (F,1cr.)

CEE 640 Foundation Engineering (F,3cr.)

CEE 641 Retaining Structures and Slopes (S,3cr.)

CEE 644 Environmental Applications of Geotechnical Engineering (S,3cr.)

CEE 649 Special Topics in Geotechnical Engineering (F,S,var.)

CEE 740 Engineering Behavior of Soils (F,3cr.)

CEE 741 Rock Engineering (S,3cr.)

CEE 744 Advanced Foundation Engineering (S,2cr.)

CEE 745 Soil Dynamics (S,3cr.)

CEE 746 Embankment Dam Engineering (S,2cr.)

CEE 749 Research in Geotechnical Engineering (F,S, var.)

CEE 840 Thesis—Geotechnical Engineering (F,S,var.)

Structural Engineering

CEE 116 Modern Structural Systems and Materials (F,3cr.)

CEE 371 Modeling of Structural Systems (S,4cr.)

CEE 372 Fundamentals of Structural Mechanics (F,3cr.)

CEE 376 Physical and Computational Material Simulation

CEE 473 Design of Concrete Structures (S,4cr.)

CEE 474 Design of Steel Structures (S,4cr.)

CEE 475 Introduction to Composite Materials (S,4cr.)

CEE 479 Collaborative Distance Design of Structural Systems

CEE 501/502 Design Project in Geotech/ Structures (F,S,3cr.)

CEE 602 Civil Infrastructure Seminar (F,S,1cr.)

CEE 671 Random Vibration (F,3cr.)

CEE 672 Fundamentals of Structural Mechanics (F,4cr.)

CEE 673 Engineering Analysis (F,3cr.)

CEE 674 Finite Element Modeling of Civil Infrastructure (S,3cr.)

CEE 675 Concrete Materials and Construction (S,3cr.)

CEE 677 Stochastic Problems in Science and Engineering (F,3cr.)

CEE 770 Engineering Fracture Mechanics (F,3cr.)

CEE 772 Finite Element Analysis for Mechanical, Structural, and Aerospace Applications (S,3cr.)

CEE 774 Advanced Structural Concrete (F,3cr.)

CEE 775 Structural Concrete Systems (S,3cr.)

CEE 776 Advanced Design of Metal Structures (F,3cr.)

CEE 777 Advanced Behavior of Metal Structures (S,3cr.)

CEE 779 Structural Dynamics and Earthquake Engineering (S,3cr.)

CEE 783 Civil and Environmental Engineering Materials Project (F,S,var.)

CEE 785 Research in Structural Engineering (F,S,var.)

CEE 786 Special Topics in Structural Engineering (F,S,var.)

CEE 880 Thesis—Structural Engineering (F,S,var.)

Environment

See also CEE 113, CEE 241, and CEE 304

Environmental Engineering

CEE 113 Environmental Engineering for the Megalopolis (F,3cr.)

CEE 351 Environmental Quality Engineering (S,3cr.)

CEE 352 Water Supply Engineering (F,3cr.)

CEE 451 Microbiology for Environmental Engineering (F,3cr.)

CEE 453 Laboratory Research in Environmental Engineering (S,3cr.)

CEE 501/502 Design Project in Environmental Engineering (F,S,3cr.)

CEE 601 Water Resources and Environmental Engineering Seminar (F,1cr.)

CEE 653 Water Chemistry for Environmental Engineering (F,3cr.)

CEE 654 Aquatic Chemistry (S,3cr.)

CEE 655 Transport, Mixing, and Transformation in the Environment (F,3cr.)

CEE 658 Sludge Treatment, Utilization, and Disposal (S,3cr.)

CEE 659 Environmental Quality Engineering Seminar (S,1cr.)

CEE 750 Research in Environmental Engineering (F,S,var.)

CEE 755 Physical/Chemical Processes (F,3cr.)

CEE 756 Biological Processes (S,3cr.)

CEE 757 Physical/Chemical Processes Laboratory (F,2cr.)

CEE 758 Biological Processes Laboratory (S,2cr.)

CEE 759 Special Topics in Environmental Engineering (F,S,var.)

CEE 850 Thesis—Environmental Engineering (F,S,var.)

Environmental Systems

See Systems Engineering and Information Technology mission areas for a listing of courses in Environmental and Public Systems.

Environmental Fluid Mechanics and Hydrology

CEE 331 Fluid Mechanics (F,Su,4cr.)

CEE 332 Hydraulic Engineering (S,4cr.)

CEE 431 Geohydrology (also GEOL 445 and ABEN 471) (F,3cr.)

CEE 432 Hydrology (S,3cr.)

CEE 435 Coastal Engineering (S,4cr.)

CEE 436 Case Studies in Environmental Fluid Mechanics (S,4cr.)

CEE 437 Experimental Methods in Fluid Dynamics (S,3cr.)

CEE 501/502 Design Project in Fluid Mechanics and Hydrology (F,S,3cr.)

CEE 601 Water Resources and Environmental Engineering Seminar (F,1cr.)

CEE 630 Advanced Fluid Mechanics (F,3cr.)

CEE 631 Flow and Contaminant Transport Modeling in Groundwater (S,3cr.)

CEE 632 Hydrology (S,3cr.)

CEE 633 Flow in Porous Media and Groundwater (F,3cr.)

CEE 634 Boundary Layer Meteorology (F,3cr.)

CEE 635 Small and Finite Amplitude Water Waves (S,3cr.)

CEE 636 Environmental Fluid Mechanics (S,3cr.)

CEE 637 Experimental Methods in Fluid Dynamics (S,4cr.)

CEE 638 Hydraulics Seminar (S,1cr.)

CEE 639 Special Topics in Hydraulics (F,S,var.)

CEE 655 Transport, Mixing, and Transformation in the Environment (F,3cr.)

CEE 732 Computational Hydraulics (F,3cr.)

CEE 735 Research in Hydraulics (F,S,var.)

CEE 830 Thesis—Fluid Mechanics and Hydrology (F,S,var.)

Systems Engineering and Information Technology

See also CEE 113, CEE 241, and CEE 304

Engineering Management

CEE 490 Management Practice in Project Engineering (S,3cr.)

CEE 590 Project Management (F,S,4cr.)

CEE 591 Engineering Management Project (F,3cr.)

CEE 592 Engineering Management Project (S,3cr.)

CEE 593 Engineering Management Methods I: Data, Information, and Modeling (F,3cr.)

CEE 594 Engineering Management Methods II: Managing Uncertain Systems (S,3cr.)

CEE 595 Construction Planning and Operations (F,3cr.)

CEE 596 Current Topics in Construction Management (S,3cr.)

CEE 597 Risk Analysis and Management (S,3cr.)

CEE 598 Introduction to Decision Analysis (F,4cr.)

CEE 692 Special Topics in Engineering Management (F,S,var.)

CEE 694 Research in Engineering Management (F,S,var.)

Environmental and Public Systems

CEE 323 Engineering Economics and Management (also ENGRG 323) (S,Su,3cr.)

CEE 501/502 Design Project in Environmental Systems (F,S,3cr.)

CEE 528 Public Political Economy (also ECON 569) (S,4cr.)

CEE 529 Water and Environmental Resources Problems and Policies (F,3cr.)

CEE 597 Risk Analysis and Management (S,3cr.)

CEE 620 Water Resources Systems Engineering (S,3cr.)

CEE 621 Stochastic Hydrology (S,3cr.)

CEE 623 Environmental Systems Engineering (F,3cr.)

CEE 628 Environmental and Water Resources Systems Analysis Seminar (S,1cr.)

CEE 722 Environmental and Water Resources Systems Analysis Research (F,S,var.)

CEE 729 Special Topics in Environmental and Water Resources Systems Analysis (F,S,var.)

CEE 820 Thesis—Environmental and Water Resources Systems (F,S,var.)

Remote Sensing

CEE 411 Remote Sensing: Environmental Applications (also SCAS 411) (S,3cr.)

CEE 610 Remote Sensing Fundamentals (F,3cr.)

CEE 615 Digital Image Processing (S,3cr.)

CEE 617 Project—Remote Sensing (F,S,var.)

CEE 618 Special Topics—Remote Sensing (F,S,var.)

CEE 710 Research—Remote Sensing (F,S,var.)

CEE 810 Thesis—Remote Sensing (F,S,var.)

Systems Engineering

CEE 504 Applied Systems Engineering (also M&AE 591, ECE 595, OR&IE 512) (F,3cr.)

CEE 505 Applied Systems Engineering II (S,4cr.)

CEE 506 Civil and Environmental Systems (S,3cr.)

CEE 509 Heuristic Methods of Optimization (also COM S 574) (S,3cr.)

CEE 603 Systems Engineering and Information Technology Seminar (F,1cr.)

Transportation

CEE 361 Introduction to Transportation Engineering (S,Su,3cr.)

CEE 463 Transportation and Information Technology (F,3cr.)

CEE 464 Transportation Systems Design (S,3cr.)

CEE 501/502 Design Project in Transportation (F,S,3cr.)

CEE 561 Urban Transportation Planning and Modeling (F,3cr.)

CEE 663 Transportation Network Analysis (S,3cr.)

CEE 762 Transportation Research (F,S,var.)

CEE 764 Special Topics in Transportation (F,S,var.)

CEE 860 Thesis—Transportation Engineering (F,S,var.)

CEE 113 Environmental Engineering for the Megalopolis (also ENGRI 113)
Fall. 3 credits. Not open (without instructor's permission) to upper-division engineering students. M. Weber-Shirk.
This is a course in the Introduction to Engineering series. For description, see ENGRI 113.

CEE 116 Modern Structural Systems and Materials (also ENGRI 116)
Fall. 3 credits. K. C. Hover.
This is a course in the Introduction to Engineering series. For description, see ENGRI 116.

CEE 241 Engineering Computation (also ENGRD 241)
Fall, spring. 3 credits. Prerequisites: COM S 100 and MATH 293. Corequisite: MATH 294 (completion of MATH 294 is suggested). J. F. Abel.
For description, see ENGRD 241.

CEE 304 Uncertainty Analysis in Engineering
Fall. 4 credits. CEE Engineering Co-op students may substitute summer ENGRD 270. Prerequisite: first-year calculus. J. R. Stedinger.
Introduction to probability theory and statistical techniques, with examples from civil, environmental, agricultural, and related disciplines. Course covers data presentation, commonly used probability distributions describing natural phenomona and material properties, parameter estimation, confidence intervals, hypothesis testing, simple linear regression, and nonparametric statistics. Examples include structural reliability, windspeed/flood distributions, and models of vehicle arrivals.

CEE 308 Introduction to CADD
Fall, spring. 1 credit. Prerequisite: permission of instructor; enrollment by application only, due the end of the first week of classes; obtain applications in 220 Hollister. J. F. Abel.
Learn to employ Computer Aided Design and Drafting (CADD) to construct 2D drawings and 3D models using a variety of AutoCAD 2000 techniques. Alternative software tools for solid modeling are introduced. Course meets in ACCEL once per week for eleven weeks, and grades are based on attendance, weekly exercises completed in class, and a semester project.

CEE 309 Special Topics in Civil and Environmental Engineering
Fall, spring. 1–6 credits. Staff.
Supervised study by individuals or groups of upper-division students on an undergraduate research project or on specialized topics not covered in regular courses.

CEE 323 Engineering Economics and Management (also ENGRG 323)
Spring; usually offered in summer for Engineering Co-op Program. 3 credits. Primarily for juniors and seniors. D. P. Loucks.
For description, see ENGRG 323.

CEE 331 Fluid Mechanics
Fall; usually offered in summer for Engineering Co-op Program. 4 credits. Prerequisite: ENGRD 202 (may be taken concurrently). E. A. Cowen.
Covers: hydrostatics, the basic equations of incompressible fluid flow, potential flow and dynamic pressure forces, viscous flow and shear forces, steady pipe flow, turbulence, dimensional analysis, laminar and turbulence boundary layer, flows around obstacles, and open-channel flow.

[CEE 332 Hydraulic Engineering
Spring. 4 credits. Prerequisite: CEE 331. Not offered 2001–2002. M. L. Weber-Shirk.
Application of fluid-mechanical principles to problems of engineering practice and design: hydraulic machinery, water-distribution systems, open-channel design, river engineering, and pollutant dispersal. Lectures supplemented by laboratory work and a design project. See www.cee.cornell.edu/cee332/ for details.]

CEE 341 Introduction to Geotechnical Engineering and Analysis
Spring. 4 credits. Letter grade only. Prerequisites: ENGRD 202, CEE 331 (or equivalent), or permission of instructor. H. E. Stewart.
Fundamentals of geotechnical engineering. Topics covered include: rigins and descriptions of soil and rock as engineering materials, subsurface exploration methods, principles of effective stresses, stress distribution and ground settlements from surface loads, steady-state and time-dependent subsurface fluid flow, soil strength and failure criteria, geoenvironmental applications, and introduction to hazardous waste containment systems.

CEE 351 Environmental Quality Engineering
Spring. 3 credits. J. J. Bisogni.
Introduction to engineering aspects of environmental quality control. Quality parameters, criteria, and standards for water and wastewater. Elementary analysis pertaining to the modeling of pollutant reactions in natural systems, and introduction to design of unit processes for water and wastewater treatment.

CEE 352 Water Supply Engineering
Fall. 3 credits. Prerequisites: CEE 351 and previous/concurrent enrollment in CEE 451 or BIOMI 290. R. I. Dick.
Analysis of contemporary threats to human health from water supplies. Criteria and standards for potable-water quality. Water-quality control theory. Design of water supply facilities.

CEE 361 Introduction to Transportation Engineering
Spring; usually offered in summer for Engineering Co-op Program. 3 credits. J. Mbwana and A. H. Meyburg.
Introduction to technological, economic, and social aspects of transportation. Emphasis is on design and functioning of transportation systems and their components. Covers: supply-demand interactions; system planning, design, and management; traffic flow and control intersection and network analysis; institutional and energy issues; and environmental impacts.

CEE 371 Modeling of Structural Systems
Spring. 4 credits. Prerequisite: ENGRD 202. K. D. Popoulia.
Analytical and computational modeling of structural systems. The course is built on case studies involving different scales and different materials such as modern steel bridges, soil-foundation-structure systems, micro-electro-mechanical structures (MEMS), and aerospace vehicle structures. Topics include: analytical methods for solving statically determinate systems; virtual work principles for determination of kinematic and static unknowns; matrix formulation of the flexibility and stiffness methods of structural analysis for statically indeterminate systems; linear members (2D truss, frame); and an introduction to finite element modeling of continua.

CEE 372 Fundamentals of Structural Mechanics
Fall. 3 credits. Prerequisites: ENGRD 202, MATH 294. K. D. Papoulia.
The course covers geometric definitions of deformation, rotation and strain; small-strain theory; and the concept of stress. Students will learn about equilibrium and conservation of energy and the concept of virtual work. Other course topics include elasticity; basic plasticity; failure criteria for design; plane stress and plane strain; stress function solutions; torsion; beam and plate theory; buckling. There will be two lectures and a recitation per week. This class is a subset of, and meets concurrently with CEE 672.

CEE 376 Physical and Computational Material Simulation
Spring. 4 credits. Prerequisites: ENGRD 202, CEE 371. S. Billington.
This course is organized around material failure phenomena such as fracture, plastic yielding, and creep in a variety of materials. Each material is presented in terms of experimental observation of physical behavior, theories for failure prediction and methods for computational simulation. Similar failure phenomena are seen in many materials at multiple length/time scales and under varying boundary conditions. Materials covered include metals, plastics, composites, concrete, smart materials and aged materials for historic preservation. Practical considerations for material use in the civil infrastructure are discussed. Includes weekly experimental and computer simulation labs as well as a course project.

CEE 400 Senior Honors Thesis
Fall, spring. 1–6 credits. Staff.
Available to students admitted to the CEE Honors Program. Supervised research, study, and/or project work resulting in a written report or honors thesis.

CEE 401 Undergraduate Engineering Teaching in CEE
Fall, spring. 1–3 credits. Prerequisite: permission of instructor. Staff.
Methods of instruction developed through discussions with faculty and by assisting with the instruction of undergraduates under the supervision of faculty.

CEE 411 Remote Sensing: Resource Inventory Methods (also SCAS 411)
Spring. 3 credits. Prerequisite: permission of instructor. S. C. DeGloria.
For description, see SCAS 411.

CEE 431 Geohydrology (also GEOL/EAS 445 and ABEN 471)
Fall. 3 credits. Prerequisites: MATH 294 and ENGRD 202. L. Cathles.
Intermediate-level study of aquifer geology, groundwater flow, and related design factors. Includes description and properties of natural aquifers, groundwater hydraulics, soil water, and solute transport.

CEE 432 Hydrology
Spring. 3 credits. Prerequisite: CEE 331. Intended for undergraduates. Lectures concurrent with CEE 632. W. H. Brutsaert.
Introduction to hydrology as a description of the water cycle and the role of water in the natural environment, and other issues for environmental engineers. See description for CEE 632.

[CEE 435 Coastal Engineering
Spring. 4 credits. Prerequisite: CEE 331. Not offered 2001–2002. P. L.-F. Liu.
Introduction to water wave phenomena, including wave generation, shoaling, refraction, diffraction, and breaking. Applications of wave theories to engineering design problems such as forces on coastal structures and beach erosion in coastal zones. Lectures supplemented by four laboratory assignments and a design project.]

CEE 436 Case Studies in Environmental Fluid Mechanics
Spring. 4 credits. Prerequisite: CEE 331 or equivalent. E.A. Cowen.
An introduction to fundamental fluid mechanics and transport processes of the environment through laboratory and field-based studies (Cayuga Lake, and Fall, Six-mile, and Cascadilla Creeks) and case studies. Topics include surface and internal wave dynamics, sediment and nutrient/contaminant transport, and interfacial transfer. Lectures are based on laboratory/field projects. Course includes a design project.

CEE 437 Experimental Methods in Fluid Dynamics
Spring. 3 credits. E. A. Cowen.
Same as CEE 637 but no project is required. For description, see CEE 637.

CEE 451 Microbiology for Environmental Engineering
Fall. 3 credits. Prerequisite: 2 semesters of college chemistry. J. M. Gossett.
An introduction to fundamental aspects of microbiology, organic chemistry, and biochemistry pertinent to environmental engineering. Topics include: nomenclature and principal reactions of organic compounds; characteristics of bacteria, fungi, algae, protozoa, and viruses relevant to water and wastewater; pathogens, disease, and immunity; environmental influences on microorganisms; bioenergetics; enzymes and metabolism; microbial genetics; and microbial ecology. This is an introductory course; consequently, it is inappropriate for those who have taken BIOMI 290 or equivalent.

CEE 453 Laboratory Research in Environmental Engineering
Spring. 3 credits. Prerequisites: CEE 351 or permission of instructor. M. L. Weber-Shirk.
Laboratory investigations of reactor flow characteristics; acid rain/lake chemistry; contaminated soil-site assessment, risk assessment, and remediation; pollutant dispersion/transport in rivers; drinking water filtration for pathogen removal; oxygen sag in rivers; and biodegradation in landfills. Design of laboratory experiments, development of laboratory methods, and use of experimental data are emphasized. See www.cee.cornell.edu/cee453/ for more information.

CEE 463 Transportation and Information Technology
Fall. 3 credits. J. R. Mbwana.
Improvements in the use of existing facilities has become an important objective in transportation planning. This course examines the role of computer and telecommunications technologies to achieve these improvements. Specific attention is focused on the development of analyses to evaluate the benefits of inclusion of these technologies in transportation systems.

CEE 464 Transportation Systems Design
Spring. 3 credits. Prerequisite: CEE 361. Staff.
Advanced techniques for physical and operational design of transportation systems, including analytical modeling techniques underlying design criteria. Evaluation of alternative designs. Management and operating policies, including investment strategies. Facility location decisions, networks, and passenger and freight terminals.

CEE 473 Design of Concrete Structures
Spring. 4 credits. Corequisites: CEE 372 or permission of instructor. K. C. Hover.
Behavior and design of reinforced concrete and structures. Discussion of how forces are transferred through elements of building system. Includes a semester project requiring the design of a reinforced concrete structure.

CEE 474 Design of Steel Structures
Spring. 4 credits. Prerequisite: CEE 372 or permission of instructor. T. Pekŏz.
Behavior and design of steel members, connections, and structures. Discussion of structural systems for buildings and bridges.

CEE 475 Introduction to Composite Materials (also M&AE 455, MS&E 555, and T&AM 455)
Spring. 4 credits. L. Phoenix.
For description, see T&AM 455.

CEE 479 Collaborative, Distance Design of Structural Systems I and II (also MAE 491)
Fall, spring. 8 credit hours. Students who enroll in CEE 479 are expected to take it in fall and spring semesters. A. Ingraffea, R. Davidson, M. Grigoriu, T. Pekoz.
This is a new senior-level design course, funded by NASA and the State of NY, and taught jointly with Syracuse University. It emphasizes teamwork, collaboration at distance, and multidisciplinary activities. The project is based on structural systems for a reusable launch vehicle. The course involves design, analysis, simulation, building, testing, virtual reality, and synchronous and asynchronous learning environments. First semester covers conceptual design, study of advanced mechanics, materials, software applications, risk and cost analysis. The second semester involves detailed design, construction, testing, and simulation.

CEE 481 LRFD-Based Engineering of Wood Structures (also ABEN 481)
Spring. 3 credits. Prerequisite: ENGRD 202.
For description see ABEN 481, in the College of Agriculture and Life Sciences section of this catalog.

CEE 490 Management Practice in Project Engineering
Spring. 3 credits. Prerequisite: permission of instructor. K. C. Hover.
An introduction to the principles of project management. Planning, organizing, communicating, scheduling, and controlling of engineering work done in project teams.

CEE 501/502 Design Project
Fall, spring. 3 credits each term. Required for students in the M.Eng. (Civil) program. Staff.
CEE design projects present students with an exemplary design experience that reflects those carried out in the course of professional practice. Projects are typically performed by student design groups and the topics reflect the diverse specialty areas of the Civil and Environmental engineering field as described below.

CEE 501/502 Design Project in Geotech Structures
Design of major civil engineering project. Planning and preliminary design during the fall term; final design completed in January intersession.

CEE 501/502 Design Project in Environmental Fluid Mechanics and Hydrology
Design of a major fluid mechanics/hydrology project.

CEE 501/502 Design Project in Environmental Engineering
Design of a major environmental engineering project.

CEE 501/502 Design Project in Environmental Systems
Design of a major environmental systems project.

CEE 501/502 Design Project in Transportation Systems
Design of a major transportation systems project. May work in conjunction with CEE 591/592 Engineering Management Project design group.

CEE 504 Applied Systems Engineering I (also COM S 504, ECE 512, M&AE 591, OR&IE 512)
Fall. 3 credits. Prerequisite: permission of instructor. Staff.
For description, see M&AE 591.

CEE 505 Applied Systems Engineering II (also COM S 505, ECE 513, M&AE 592, OR&IE 513)
Spring. 3 credits. Prerequisite: Applied Systems Engineering I (CEE 504, COM S 504, ECE 512, M&AE 591, or OR&IE 512). M. Turnquist, P. Jackson, and R. Thomas.
For description, see M&AE 592.

CEE 506 Civil and Environmental Systems
Spring. 3 credits. Prerequisites: CEE 304 (or equivalent) and CEE 323 (or equivalent). Letter or S-U. R. Davidson.
Introduction to framing and solutions of a variety of civil and environmental engineering problems using a systems engineering approach. Case studies in structural, geotechnical, environmental, and transportation engineering. Systems tools include optimization, life-cycle cost analysis, simulation, and risk analysis.

CEE 509 Heuristic Methods for Optimization (also COM S 574)
Spring. 3 or 4 credits. Prerequisites: CEE/ENGRD 241 or COM S/ENGRD 211 or 222 or graduate standing, or permission of instructor. Not offered every year. C. A. Shoemaker and B. Selman.
This course describes a variety of heuristic search methods including simulated annealing, tabu search, genetic algorithms, derandomized evolution strategy, random walk, and direct search algorithms. Algorithms are used to find values of discrete and/or continuous variables arising in optimization and model fitting. Applications are discussed in a range of areas including some of the following: artificial intelligence, scheduling, protein folding, economic planning, water quality protection, telecommunications, and robotics. The advantages and disadvantages of heuristic search methods for both serial and parallel computation are discussed in comparison to other optimization algorithms.

CEE 528 Public Political Economy (also ECON 539)
Spring. 4 credits. R. E. Schuler.
For description, see ECON 539.

[CEE 529 Water and Environmental Resources Problems and Policies
Fall. 3 credits. Intended primarily for graduate engineering and non-engineering students but open to qualified juniors and seniors. Prerequisite: permission of instructor. Not offered 2001–2002. D. J. Allee and L. B. Dworsky.
Evaluation, appraisal, and prospects for problems involving water and environmental resources. Organization and public policies in the federal system.]

[CEE 561 Urban Transportation Planning and Modeling
Fall. 3 credits. Prerequisites: CEE 361, statistics and probability, or permission of instructor. Designed for seniors with appropriate background and graduate students from CEE, CRP, and CIPA. Not offered 2001–2002. A. H. Meyburg.
This course exposes students to modern transportation planning practice and to the analytical tools necessary to engage in this field. Emphasis is on passenger transportation in the urban context. The course discusses the legislative, political, and economic contexts of urban transportation planning (UTP). It presents the travel demand estimation process and the associated models and approaches. Finally, it evaluates the forecasting results and assesses energy and environmental impacts. Student projects are an important element of the course.]

CEE 590 Project Management
Fall, spring. 4 credits. Prerequisite: permission of instructor. A. H. Meyburg and F. J. Wayno.
A core graduate course in project management for people who will manage technical or engineering projects. Focuses both on the "technical" tools of project management (methods for planning, scheduling, and control) and the "human" side (forming a project team, managing performance, resolving conflicts, etc.), with somewhat greater emphasis on the latter.

CEE 591 Engineering Management Project
Fall. 3 credits. Prerequisite: permission of instructor. Staff.
An intensive evaluation of the management aspects of a major engineering project or system. Most students work on a large group project in the area of project management, but students may also work singly or in small groups on an engineering management topic of special interest to them.

CEE 592 Engineering Management Project
Spring. 3 credits. Prerequisite: permission of instructor. Staff.
A continuation of CEE 591.

CEE 593 Engineering Management Methods I: Data, Information, and Modeling
Fall. 3 credits. Prerequisites: CEE 323 and CEE 304 or equivalent. M. A. Turnquist.
Methods for managing data and transforming data into information. Modeling as a means to synthesize information into knowledge that can form the basis for decisions and actions. Application of statistical methods and optimization to managerial problems in project design, scheduling, operation, quality control, forecasting, and resource allocation.

CEE 594 Engineering Management Methods II: Managing Uncertain Systems
Spring. 3 credits. Prerequisite: CEE 593 or permission of instructor. M. A. Turnquist.
This course covers: modeling and managing systems in which uncertainty is a major determinant of system behavior; systems which are subject to breakdown, deterioration, and queuing; and simulation as a tool for analyzing uncertain systems. Projects and case studies are used to illustrate application of the methods.

CEE 595 Construction Planning and Operations
Fall. 3 credits. P. Carr.
A course on the fundamentals of construction planning: organization of the worksite, construction planning, scheduling, and cost estimating, bidding, temporary structures, applications of computer methods, and the relationships among owners, designers, contractors, suppliers, and developers.

[CEE 596 Current Topics in Construction Management
Spring. 3 credits. Prerequisite: CEE 595 or equivalent. Not offered 2001–2002. Staff.
This course focuses on recent trends in the professional management of construction projects and organizations. It draws from literature, practicing construction managers, software producers, and research. The course seeks to identify and evaluate trends and prepare students for management positions in engineering design and construction.]

CEE 597 Risk Analysis and Management
Spring. 3 credits. Prerequisite: An introduction to Probability and Statistics course such as: CEE 304, ENGRD 270, ILSRT 210, BTRY 261 or AEM (ARME) 210; and two semesters of calculus. J. R. Stedinger.
Course develops a working knowledge of risk terminology and reliability engineering, analytic tools and models used to analyze environmental and technological risks, and social and psychological risk issues. Discussions address life risks in the United States, transportation risks, industrial accidents, waste incineration, air pollution modeling, public health, regulatory policy, risk communication, and risk management.

CEE 598 Introduction to Decision Analysis
Fall. 3 credits. R. Davidson.
Framework to structure the way we think about decision situations that are complicated by uncertainty, complexity, and competing objectives. Specific decision analysis concepts and tools, such as influence diagrams, decision trees, sensitivity analysis, value of information, and utility theory. Applications to all areas of engineering and life.

CEE 601 Water Resources and Environmental Engineering Seminar
Fall. 1 credit. J. Gossett.
Presentation of topics of current interest.

CEE 602 Civil Infrastructure Seminar
Fall, spring. 1 credit. Required for first-year graduate students. Staff.
Presentation of topics of current interest.

CEE 603 Systems Engineering and Information Technology Seminar
Fall, spring. 1 credit. Staff.
Presentation of topics of current interest.

CEE 605 Issues in Risk Analysis Seminar
Fall. 1 credit. S-U option. Staff.
Discussion of current issues and ongoing research on risk analysis issues from many perspectives with an emphasis on environmental risk analysis. Speakers address problem formulation, quantitative/qualitative methods in assessment of risk, communication issues, and challenges to risk assessment methodologies. Some sessions held jointly with other seminar series. Enrollment in seminar requires short reports and participation in two required discussion meetings for class members designed to integrate the issues raised during the semester.

CEE 610 Remote Sensing Fundamentals (also SCAS 660)
Fall. 3 credits. Prerequisite: permission of instructor. W. D. Philpot.
An introduction to equipment and methods used in obtaining information about earth resources and the environment from aircraft or satellite. Coverage includes sensors, sensor and ground-data aquisition, data analysis and interpretation, and project design.

CEE 615 Digital Image Processing
Spring. 3 credits. Prerequisites: facility with algebra and trigonometry (e.g., MATH 109) and statistics (e.g., CEE 304 or ARME 310), or permission of instructor. W. D. Philpot.
An introduction to digital image-processing concepts and techniques, with emphasis on remote-sensing applications. Topics include image acquisition, enhancement procedures, spatial and spectral feature extraction, and classification, with an introduction to hyperspectral data analysis. Assignments require the use of image-processing software and graphics.

CEE 617 Project—Remote Sensing
On demand. 1–6 credits. W. D. Philpot.
Students may elect to undertake a project in remote sensing. The work is supervised by a professor in this subject area.

CEE 618 Special Topics—Remote Sensing
On demand. 1–6 credits. W. D. Philpot.
Supervised study in small groups on one or more special topics not covered in the regular courses. Special topics may be of a theoretical or applied nature.

CEE 620 Water-Resources Systems Engineering
Spring. 3 credits. Prerequisites: CEE 323 and CEE 593. D. P. Loucks.
Development and application of deterministic and stochastic optimization and simulation models for water-resources planning and management. Covers river-basin modeling, including reservoir design and operation, irrigation planning and operation, hydropower-capacity development, flow augmentation, flood control and protection, and water-quality prediction and control.

CEE 621 Stochastic Hydrology
Spring. 3 credits. Prerequisites: CEE 304 or permission of instructor. J. R. Stedinger.
Course examines statistical, time series, and stochastic optimization methods used to address water resources planning and management problems involving uncertainty objectives and hydrologic inputs. Statistical issues include: maximum likelihood and moments estimators; censored datasets and historical information; probability plotting; Bayesian inference; regionalization methods; ARMA models; multivariate stochastic streamflow models; stochastic simulation; and stochastic reservoir-operation optimization models.

[CEE 623 Environmental Quality Systems Engineering
Fall. 3 credits. Prerequisites: MATH 294, optimization, and graduate standing or permission of instructor. Not offered 2001–2002. C. A. Shoemaker.
Applications of optimization, simulation methods, and uncertainty analysis to the prevention and remediation of pollution. Case studies include: regional waste and wastewater treatment, restoration of dissolved oxygen levels in rivers, and reclamation of contaminated groundwater. Applications use linear programming, integer, dynamic, nonlinear programming, and sensitivity analysis.]

CEE 628 Environmental and Water Resources Systems Analysis Seminar
Spring. 1 credit. Prerequisite: permission of instructor. Staff.
Graduate students and faculty members give informal lectures on various topics related to ongoing research in environmental or water resources systems planning and analysis.

[CEE 630 Advanced Fluid Mechanics
Fall. 3 credits. Prerequisite: CEE 331. Not offered 2001–2002. Staff.
Introduction to tensor analysis; conservation of mass, momentum, and energy. Rigorous treatment includes study of: exact solutions of Navier-Stokes equations; asymptotic approximations at low and high Reynolds numbers; similitude and modeling; and Laminar diffusion of momentum, mass, and heat.]

[CEE 631 Flow and Contaminant Transport Modeling in Groundwater
Spring. 3 credits. Prerequisites: MATH 294 or equivalent, ENGRD 241 or experience in numerical methods and programming, and elementary fluid mechanics. Not offered 2001–2002. P. L.-F. Liu.
Potential flows and their calculation. Numerical methods include finite difference, finite elements, and boundary elements. Covers: fundamental equations of saturated and unsaturated flow in porous media; flow in fractured media; numerical modeling of transport in porous media; diffusion and advective diffusion in one, two, and three dimensions; anisotropy; and additional terms for reactive substances. The course includes the use of computer programs.]

[CEE 632 Hydrology
Spring. 3 credits. Prerequisite: CEE 331. Not offered 2001–2002. W. H. Brutsaert.
Introduction to hydrology as a description of the water cycle and the role of water in the natural environment, and other issues for environmental engineers and scientists. Covers: physical and statistical prediction methods for design related to hydrologic processes; hydrometeorology and evaporation; infiltration and base flow; surface runoff and channel routing; linear and nonlinear hydrologic systems; and storage routing and unit hydrograph methods.]

CEE 633 Flow in Porous Media and Groundwater
Fall. 3 credits. Prerequisite: CEE 331. W. H. Brutsaert.
Fluid mechanics and equations of single-phase and multiphase flow; methods of solution. Applications involve aquifer hydraulics, pumping wells; drought flows; infiltration, groundwater recharge; land subsidence; seawater intrusion, miscible displacement; and transient seepage in unsaturated materials.

[CEE 634 Boundary Layer Meteorology
Fall. 3 credits. Prerequisite: CEE 331 or permission of instructor. Not offered 2001–2002. W. H. Brutsaert.
Physical processes in the lower atmospheric environment: turbulent transport in the atmospheric boundary layer, surface-air interaction, disturbed boundary layers, radiation. Applications include sensible and latent heat transfer from lakes, plant canopy flow and evapotranspiration, turbulent diffusion from chimneys and cooling towers, and related design issues.]

[CEE 635 Small and Finite Amplitude Water Waves
Spring. 3 credits. Prerequisite: CEE 435 or equivalent. Not offered 2001–2002. P. L.-F. Liu.
Review of linear and nonlinear theories of ocean waves. Discussions on the applicability of different wave theories to engineering problems.]

[CEE 636 Environmental Fluid Mechanics
Spring. 3 credits. Not offered 2001–2002. E. A. Cowen.
Course covers: analytic and modeling perspectives of environmental flows; mechanics of layered and continuously stratified fluids: internal waves, density currents, baroclinic motions, and turbulence; jets and plumes and their behavior in the environment; turbulent diffusion, shear flow dispersion, and wave-induced mixing processes; and applications to mixing processes in rivers, lakes, estuaries and the coastal ocean.]

CEE 637 Experimental Methods in Fluid Dynamics
Spring. 4 credits. E. A. Cowen.
Introduction to experimental data collection and analysis, in the particular, as they pertain to fluid flows. Covers: computer based experimental control, analog and digital data acquisition, discrete sampling theory, digital signal processing, uncertainty analysis. Also covers: analog transducers, acoustic and laser Doppler velocimetry, full-field (2-D) quantitative imaging techniques. Includes laboratory experiments and a project.

CEE 638 Hydraulics Seminar
Spring. 1 credit. Open to undergraduates and graduates and required of graduate students majoring in hydraulics or hydraulic engineering. Staff.
Topics of current interest in fluid mechanics, hydraulic engineering, and hydrology.

CEE 639 Special Topics in Hydraulics
On demand. 1–6 credits. Staff.
Special topics in fluid mechanics, hydraulic engineering, or hydrology.

CEE 640 Foundation Engineering
Fall. 3 credits. Prerequisite: CEE 341. F. H. Kulhawy.
Course covers: soil exploration, sampling, and in-situ testing techniques; bearing capacity, stress distribution, and settlement; design of shallow and deep foundations; compaction and site preparation; and seepage and dewatering of foundation excavations.

CEE 641 Retaining Structures and Slopes
Spring. 3 credits. Prerequisite: CEE 341. T. D. O'Rourke.
Course covers: Earth pressure theories; design of rigid, flexible, braced, tied-back, slurry, and reinforced soil structures; stability of excavation, cut, and natural slopes; and design problems stressing application of course material under field conditions of engineering practice.

CEE 644 Environmental Applications of Geotechnical Engineering
Spring. 3 credits. Prerequisite: CEE 341 or equivalent. T. D. O'Rourke.
Covers principles of hydrogeology, contaminant migration, and remediation technologies

related to geotechnical and environmental engineering. Emphasis is on environmental site assessment, site feasibility studies, selection of remediation procedures, and engineered landfills. Design problems are based on real projects and involve visits from practicing engineers.

CEE 649 Special Topics in Geotechnical Engineering
On demand. 1–6 credits. Staff.
Supervised study of special topics not covered in the formal courses.

CEE 653 Water Chemistry for Environmental Engineering
Fall. 3 credits. Prerequisite: 1 semester of college chemistry or permission of instructor. L. W. Lion.
Principles of chemistry applicable to the understanding, design, and control of water and wastewater treatment processes and to reactions in receiving waters. Topics include chemical thermodynamics, reaction kinetics, acid-base equilibria, mineral precipitation/dissolution, and electrochemistry. The focus of the course is on the mathematical description of chemical reactions relevant to engineered processes and natural systems, and the numerical or graphical solution of these problems.

[CEE 654 Aquatic Chemistry
Spring. 3 credits. Prerequisite: CEE 653 or CHEM 287–288. Not offered 2001–2002. J. J. Bisogni.
Concepts of chemical equilibria applied to natural aquatic systems. Topics include acid-base reactions, buffer systems, mineral precipitation, coordination and redox reactions, Eh-pH diagrams adsorption phenomena, humic acid chemistry, and chemical-equilibria computational techniques. In-depth coverage of topics covered in CEE 653.]

CEE 655 Transport, Mixing, and Transformation in the Environment
Fall. 3 credits. Prerequisite: CEE 331. J. J. Bisogni.
Application of fluid mechanics to problems of transport, mixing, and transformation in the water environment. Introduction to advective, diffuse, and dispersive processes in the environment. Boundary interactions: air-water and sediment-water processes. Introduction to chemical and biochemical transformation processes. Applications to transport, mixing, and transformation in rivers, lakes, and coastal waters.

[CEE 658 Sludge Treatment, Utilization, and Disposal
Spring. 3 credits. Prerequisite: CEE 352 or permission of instructor. Not offered 2001–2002. R. I. Dick.
Analysis of the quantity and quality of residues produced from municipal and industrial water-supply and pollution-control facilities and other residue-producing processes. Alternatives for reclaiming or disposing of hazardous and nonhazardous residues. Performance of treatment processes for altering sludge properties prior to reuse or ultimate disposal. Considerations in selecting and integrating of sludge-management processes.]

CEE 659 Environmental Quality Engineering Seminar
Spring. 1 credit. Prerequisite: enrollment as graduate student in environmental engineering. R. I. Dick.
Presentation and discussion of current research in environmental engineering.

[CEE 663 Transportation Network Analysis
Spring. 3 credits. Prerequisites: CEE 463 or CEE 464, or permission of instructor. Not offered 2001–2002. M. A. Turnquist.
Topics in flow prediction and estimation for transportation networks, including equilibrium assignment, stochastic network loading, trip table estimation, dynamic vehicle allocation, and routing/scheduling models.]

[CEE 671 Random Vibration
Fall. 3 credits. Prerequisites: M&AE 326, CEE 779, and OR&IE 260; or equivalent and permission of the instructor. Not offered 2001–2002. M. D. Grigoriu.
Review of random-process theory, simulation, and first-passage time. Linear random vibration: second-moment response descriptors and applications from fatigue; seismic analysis; and response to wind, wave, and other non-Gaussian load processes. Nonlinear random vibration: equivalent linearization, perturbation techniques, Fokker-Planck and Kolmogorov equations, Itō calculus, and applications from chaotic vibration, fatigue, seismic analysis, and parametrically excited systems.]

CEE 672 Fundamentals of Structural Mechanics
Fall. 4 credits. Corequisite: CEE 673 or T&AM 610. K. D. Papoulia.
Geometric definitions of deformation, rotation and strain; small-strain theory; concept of stress. Equilibrium and conservation of energy; virtual work. Elements of constitutive theory; elasticity; basic plasticity. Failure criteria for design. Plane stress and plane strain; stress function solutions. Torsion. Several beam theories (shear deformable, dynamic, warping, beam on elastic foundation) based on virtual work. Plate theory and elements of shell theory. Stability. Three lectures and a recitation per week.

CEE 673 Engineering Analysis
Fall. 3 credits. Prerequisite: instructor permission. M. D. Grigoriu.
Vector spaces, linear transformations and eigenvalue problems with applications to matrix structural analysis, linear dynamics, stability, and principal stresses, strains, and moments of inertia. Fourier analysis for periodic and non-periodic functions, with applications to the solution of ordinary differential equations, beams, plates, and other structural mechanics problems. Partial differential equations with applications to the analysis of static and dynamic response of continuous systems and transport problems.

CEE 674 Finite Element Modeling of Civil Infrastructure
Spring. 3 credits. Prerequisites: CEE 371 and either CEE 372 or CEE 67. K. D. Papoulia.
Matrix methods of structural analysis; truss and frame analysis; computer programming of displacement (stiffness) method. Covers: the finite element method as an extension of the displacement method of structural analysis; basic two- and three-dimensional continuum elements. Introduction to nonlinear analysis. Emphasis is on applications in Civil Infrastructure design. The course develops the knowledge base for intelligent usage of finite element programs for structural and geotechnical engineers. Brief exposition of the theory and informed use of commercial codes on more advanced topics: shell elements, material and geometric nonlinearity. Also includes: applications to concrete, steel and soil structures; solution methods; transient problems.

[CEE 675 Concrete Materials and Construction
Spring. 3 credits. Prerequisite: CEE 376 or equivalent. Not offered 2001–2002. K. C. Hover.
Materials science, structural engineering, and construction technology involved in the materials aspects of the use of concrete. Cement chemistry and physics, mix design, admixtures, engineering properties, testing of fresh and hardened concrete, and the effects of construction techniques on material behavior.]

CEE 677 Stochastic Problems in Science and Engineering
Fall. 3 credits. Prerequisites: permission of Instructor. M. D. Grigoriu.
Review of probability theory, stochastic processes, and Ito formula with illustrations by Monte Carlo Simulation. Analytical and numerical methods for solving stochastic problems defined by algebraic, differential, and integral equations with random/deterministic coefficients and random/deterministic input. Applications include: solution of Laplace, transport, Schrodinger, and other deterministic partial differential equations; dynamic systems subjected to Gaussian and non-Gaussian noise; random eigenvalue problems; and homogenization, structure evolution, and pattern formation for random heterogeneous materials.

CEE 692 Special Topics in Engineering Management
On demand. 1–6 credits. Staff.
Individually supervised study of one or more specialized topics not covered in regular courses.

CEE 694 Research in Engineering Management
On demand. 1–6 credits. Staff.
The student may select an area of investigation in engineering management. Results should be submitted to the instructor in charge in the form of a research report.

CEE 710 Research—Remote Sensing
On demand. 1–6 credits. W. D. Philpot.
For students who want to study one particular area in depth. The work may take the form of laboratory investigation, field study, theoretical analysis, or development of design procedures.

CEE 722 Environmental and Water Resources Systems Analysis Research
On demand. 1–6 credits. Prerequisite: permission of instructor. Preparation must be suitable to the investigation to be undertaken. Staff.
Investigations of particular environmental or water resources systems problems.

CEE 729 Special Topics in Environmental or Water Resources Systems Analysis
On demand. 1–6 credits. Staff.
Supervised study, by individuals or small groups, of one or more specialized topics not covered in regular courses.

[CEE 732 Computational Hydraulics
Fall. 3 credits. Prerequisite: elementary fluid mechanics or permission of instructor. Offered alternate years. Not offered 2001–2002. Staff.
This course covers: numerical methods for solving hydraulics and fluid-mechanics problems; solutions for elliptic, parabolic, and hyperbolic equations; and finite-difference, finite-element, and boundary-integral methods.]

CEE 735 Research in Hydraulics
On demand. 1–6 credits. Staff.
The student may select an area of investigation in fluid mechanics, hydraulic engineering, or hydrology. The work may be either experimental or theoretical in nature. Results should be submitted to the instructor in charge in the form of a research report.

CEE 740 Engineering Behavior of Soils
Fall. 3 credits. Prerequisite: CEE 341. H. E. Stewart.
Detailed study of the physiochemical nature of soil. Stress states due to geostatic loading and stress-history effects. In-depth evaluation of stress-strain-strength, compressibility, and hydraulic conductivity of natural soils. Includes laboratory and field-testing methods for determining properties.

CEE 741 Rock Engineering
Spring. 3 credits. Prerequisite: CEE 341 or permission of instructor. Recommended: introductory geology. T. D. O'Rourke.
Geological and engineering classifications of intact rock, discontinuities, and rock masses. Includes laboratory and field evaluation of properties. Covers: stress states and stress analysis; design of foundations on, and openings in, rock masses; and analysis of the stability of rock slopes.

[CEE 744 Advanced Foundation Engineering
Spring. 2 credits. Prerequisite: CEE 640. Not offered 2001–2002. F. H. Kulhawy.
A continuation of CEE 640, with detailed emphasis on special topics in soil-structure interaction. Typical topics include lateral and pullout loading of deep foundations, pile group behavior, foundations for offshore structures, foundations for special structures.]

CEE 745 Soil Dynamics
Spring. 3 credits. Prerequisite: permission of instructor. H. E. Stewart.
Study of soil behavior under dynamic loading conditions. Foundation design for vibratory loadings. Introductory earthquake engineering including field and laboratory techniques for determining dynamic soil properties and liquefaction potential. Covers design of embankments and retaining structures under dynamic loading conditions.

CEE 746 Embankment Dam Engineering
Spring. 2 credits. Prerequisites: CEE 641 and 741, or permission of instructor. F. H. Kulhawy.
Principles of analysis and design for earth and rockfill dams. Materials, construction methods, internal and external stability, seepage and drainage, performance monitoring, abutment and foundation evaluation. Introduction to tailings dams.

CEE 749 Research in Geotechnical Engineering
On demand. 1–6 credits. Staff.
For students who want to pursue a particular geotechnical topic in considerable depth.

CEE 750 Research in Environmental Engineering
On demand. 1–6 credits. Staff.
For students who want to study a particular area in depth. The work may take the form of laboratory investigation, field study, theoretical analysis, or development of design and analysis procedures.

CEE 755 Physical/Chemical Processes
Fall. 3 credits. Prerequisite: previous or concurrent enrollment in CEE 653 or permission of instructor. J. J. Bisogni.
Theoretical and engineering aspects of chemical and physical phenomena and processes applicable to the removal of impurities from water, wastewater, and industrial wastes and to their transformation in the environment. Analysis and design of treatment processes and systems.

CEE 756 Biological Processes
Spring. 3 credits. Prerequisites: an introductory course in microbiology and CEE 755, or permission of instructor. J. M. Gossett.
Theoretical and engineering aspects of biological phenomena and processes applicable to the removal of impurities from water, wastewater, and industrial wastes and to their transformation in the environment. Biokinetic analysis and design of biological treatment process.

CEE 757 Environmental Engineering Process Laboratory I
Fall. 2 credits. Prerequisite: concurrent enrollment in CEE 653 and CEE 755. M. Weber-Shirk.
Laboratory studies of aquatic chemistry and physical/chemical processes of environmental engineering. Topics include: gravimetric analyses; acids/bases; alkalinity; gas chromatography; UV-visible and atomic absorption spectrophotometry; adsorption; filtration; ion exchange; gas transfer; sedimentation; characterization of reactor mixing regimes; and coagulation.

CEE 758 Biological Processes Laboratory
Spring. 2 credits. Prerequisite: concurrent enrollment in CEE 756. J. M. Gossett.
Laboratory studies of microbiological phenomena and environmental engineering processes. Topics include microscopy; biochemical and chemical oxygen demand; biological treatability studies; and enumeration of bacteria.

CEE 759 Special Topics in Environmental Engineering
On demand. 1–6 credits. Staff.
Supervised study in special topics not covered in formal courses.

CEE 762 Transportation Research
On demand. 1–6 credits. Staff.
In-depth investigation of a particular transportation planning or engineering problem mutually agreed upon between the student and one or more faculty members.

CEE 764 Special Topics in Transportation
On demand. 1–6 credits. Staff.
Advanced subject matter not covered in depth in other regular courses.

CEE 770 Engineering Fracture Mechanics
Spring. 3 credits. Prerequisite: CEE 674 or CEE 772 (MAE 680/T&AM 666) and T&AM 753, or permission of instructor. Offered alternate years. Not offered 2002–2003. A. Ingraffea
Computational and physical modeling of crack growth processes. Finite and boundary element based simulation of brittle fracture initiation and propagation, fatigue crack growth, and elasto-plastic and cohesive approaches to inelastic crack growth. Element formulation, meshing and remeshing, interactive steering. Case studies across scales from geomechanics to micromechanics, and including metals, ceramics, and polymers. Laboratory techniques for fracture toughness, crack growth rate, and trajectory testing.

CEE 772 Finite Element Analysis (also M&AE 680 and T&AM 666)
Spring. 3 credits. Prerequisites: T&AM 663 or equivalent. Staff.
For description, see M&AE 680.

[CEE 773 Structural Reliability
Fall. 3 credits. Prerequisite: permission of instructor. Offered alternate years. Not offered 2001–2002. M. D. Grigoriu.
Review of probability theory, practical measures for structural reliability, second-moment reliability indices, probability models for strength and loads, probability-based design codes, reliability of structural systems, imperfection-sensitive structures, fatigue, stochastic finite-element techniques, and elementary concepts of probabilistic fracture mechanics.]

CEE 774 Advanced Structural Concrete
Fall. 3 credits. Prerequisite: undergraduate concrete design course. S. Billington.
Advanced behavior, analysis and design of structural concrete with an introduction to prestressing. Emphasis is on modeling for flexure, shear, torsion and in particular disturbed regions. Includes a course project.

CEE 775 Structural Concrete Systems
Spring. 3 credits. Offered alternate years. Prerequisite: CEE 774.
Topics include: behavior and design of structural concrete building and bridge systems; integration of material, component and system modeling and simulation with structural design; and repair and retrofit of structures. Includes a course project.

CEE 776 Advanced Design of Metal Structures
Fall. 3 credits. Prerequisite: CEE 374 or equivalent. T. Pekoz.
Preliminary design of structural systems. Behavior and design of members and connections. Behavior and computer-aided design of building frames.

[CEE 777 Advanced Behavior of Metal Structures
Spring. 3 credits. Prerequisite: CEE 374 or equivalent. Not offered 2001–2002. T. Pekŏz.
Analysis of elastic and inelastic stability. Behavior and design of hot-rolled and cold-rolled steel and aluminum members, elements, and frames. Critical review of design specifications.]

CEE 779 Structural Dynamics and Earthquake Engineering
Spring. 3 credits. M. D. Grigoriu.
Modal analysis, numerical methods, and frequency-domain analysis. Introduction to earthquake-resistant design.

CEE 783 Civil and Environmental Engineering Materials Project
On demand. 1–3 credits. Staff.
Individual projects or reading and study assignments involving engineering materials.

CEE 785 Research in Structural Engineering
On demand. 1–6 credits. Staff.
Pursuit of a branch of structural engineering beyond what is covered in regular courses. Theoretical or experimental investigation of suitable problems.

CEE 786 Special Topics in Structural Engineering
On demand. 1–6 credits. Staff.
Individually supervised study or independent design or research in specialized topics not covered in regular courses. Occasional offering of such special courses as Shell Theory and Design, and Advanced Topics in Finite Element Analysis.

CEE 810 Thesis—Remote Sensing
Fall, spring. 1–12 credits. Students must register for credit with the professor at the start of each term. W. D. Philpot.
A thesis research topic is selected by the student with the advice of the faculty member in charge and is pursued either independently or in conjunction with others working on the same topic.

CEE 820 Thesis—Environmental and Water Resource Systems
Fall, spring. 1–12 credits. Students must register for credit with the professor at the start of each term. Staff.
A thesis research topic is selected by the student with the advice of the faculty member in charge and is pursued either independently or in conjunction with others working on the same topic.

CEE 830 Thesis—Fluid Mechanics and Hydrology
Fall, spring. 1–12 credits. Students must register for credit with the professor at the start of each term. Staff.
A thesis resarch topic is selected by the student with the advice of the faculty member in charge and is pursued either independently or in conjunction with others working on the same topic.

CEE 840 Thesis—Geotechnical Engineering
Fall, spring. 1–12 credits. Students must register for credit with the professor at the start of each term. Staff.
A thesis research topic is selected by the student with the advice of the faculty member in charge and is pursued either independently or in conjunction with others working on the same topic.

CEE 850 Thesis—Environmental Engineering
Fall, spring. 1–12 credits. Students must register for credit with the professor at the start of each term. Staff.
A thesis research topic is selected by the student with the advice of the faculty member in charge and is pursued either independently or in conjunction with others working on the same topic.

CEE 860 Thesis—Transportation Engineering
Fall, spring. 1–12 credits. Students must register for credit with the professor at the start of each term. Staff.
A thesis research topic is selected by the student with the advice of the faculty member in charge and is pursued either independently or in conjunction with others working on the same topic.

CEE 880 Thesis—Structural Engineering
Fall, spring. 1–12 credits. Students must register for credit with the professor at the start of each term. Staff.
A thesis research topic is selected by the student with the advice of the faculty member in charge and is pursued either independently or in conjunction with others working on the same topic.

COMPUTER SCIENCE

The Department of Computer Science is part of both the College of Arts and Sciences and the College of Engineering.

COM S 099 Fundamental Programming Concepts
Fall, summer. 2 credits. No prerequisites. S-U grades only. Credit cannot be applied toward the Engineering degree. Freshmen only.
This course is designed for students who intend to take COM S 100 but are not adequately prepared for that course. Basic programming concepts and problem analysis are studied. An appropriate high-level programming language is used. Students with previous programming experience and students who do not intend to take COM S 100 should not take this course.

COM S 100 Introduction to Computer Programming
Fall, spring, summer. 4 credits.
An introduction to elementary computer programming concepts. Emphasis is on techniques of problem analysis and the development of algorithms and programs. There are two versions of the course. Both provide adequate preparation for COM S/ ENGRD 211. Both versions are not offered every semester.

COM S 100M Introduction to Computer Programming
Corequisite: MATH 111, 191, or equivalent.
This version starts with a seven-week introduction to programming in MATLAB. Iteration, functions, and arrays are introduced. During the second seven weeks of the course students examine how these ideas are handled in the object-oriented framework provided by the Java programming language. Throughout the course, examples and assignments are chosen to give the student an appreciation for computational science and engineering. The pace of the course assumes that the student has no prior programming experience.

COM S 100J Introduction to Computer Programming
This course is an introduction to programming using the Java programming language. A two-week unit on MATLAB is included. Topics include algorithms, language concepts, selection, repetition, functions, objects and classes, arrays, strings, and inheritance. Principles of software development and style are emphasized. The course assumes basic high school mathematics (no calculus) but no programming experience.

COM S 101 Introduction to Cognitive Science (also COGST 101, LING 170, and PSYCH 102)
Fall. 3 credits.
For description, see COGST 101.

COM S 113 Introduction to C
Fall, spring. 1 credit. Usually weeks 1–4. Prerequisite: COM S 100 or equivalent programming experience. Credit is granted for both COM S 113 and 213 only if 113 is taken first. S-U grades only.
A brief introduction to the C programming language and standard libraries. Unix accounts are made available for students wishing to use that system for projects, but familiarity with Unix is not required. (Projects may be done using any modern implementation of C). COM S 213 (C++ Programming) includes much of the material covered in 113. Students planning to take COM S 213 normally do not need to take 113.

COM S 114 Unix Tools
Fall. 1 credit. Usually weeks 5–8. Prerequisite: COM S 100 or equivalent programming experience. S-U grades only.
An introduction to Unix, emphasizing tools for file management, communication, process control, managing your Unix environment and rudimentary shell scripts. Knowledge of at least one programming language is encouraged. Projects assume no previous knowledge of Unix or expertise in any particular language.

COM S 130 Creating Web Documents
Fall. 3 credits. No prerequisites.
Interactive on-line media such as the World Wide Web are revolutionizing the way we communicate. This course introduces students having little or no computer background to tools and techniques for creating interactive documents. Questions of both design and technical issues are emphasized. Students must think seriously about digital graphic impact and must learn how to do some relatively simple programming with a scripting language (such as JavaScript). Topics covered include HTML; JavaScript; interaction techniques (elementary DHTML); ways of coping with slow connections; the incorporation of sound, video, and images in web documents; animation techniques (Flash 5); ethics; and e-commerce.

COM S 191 Media Arts Studio I (also ART 391, THETR 391)
Fall. 3 hours. Prerequisites: one of the following courses: ART 171, THETR 277, 377, MUSIC 120, or equivalent. Also must be a junior and have permission of instructor. Lab fee $50.
For description, see ART 391.

COM S 201 Cognitive Science in Context Laboratory (also COGST 201 and PSYCH 201)
Fall or spring. 4 credits. Limited to 24 students. Prerequisite: concurrent or prior registration in Introduction to Cognitive Science (PSYCH 102/COGST 101/COM S 101/LING 170/PHIL 191) is suggested but not required. Knowledge of programming languages is not assumed. Fall, B. Halpern and staff; spring, D. Field and staff.
For description, see COGST 201.

COM S 202 Transition to Java
Fall, spring. Usually weeks 1–4. 1 credit. Prerequisite: one semester-long programming course.
A brisk introduction to the Java programming language that assumes programming knowledge in at least one other object-oriented language.

COM S 211 Computers and Programming (also ENGRD 211)
Fall, spring, summer. 3 credits. Prerequisite: COM S 100 or an equivalent course in Java or C++.
Intermediate programming in a high-level language and introduction to computer science. Topics include program structure and organization, modules (classes), program development, proofs of program correctness, recursion, data structures and types (lists, stacks, queues, trees), object-oriented and functional programming, analysis of algorithms, and an introduction to elementary graph theory and graph algorithms. Java is the principal programming language. Knowledge of classes and objects is assumed.

COM S 212 Java Practicum
Fall, spring. 1 credit. Letter grade only. Pre- or corequisite: COM S/ENGRD 211.
A project course that introduces students to the ways of software engineering using the Java programming language. The course requires the design and implementation of several large programs

COM S 213 C++ Programming
Fall, spring. 2 credits. Prerequisite: COM S 100 or equivalent programming experience. Students who plan to take COM S 113 and 213 must take 113 first. S-U grades only.
An intermediate-level introduction to the C++ programming language and the C/C++ standard libraries. Topics include basic statements, declarations, and types; stream I/O; user defined classes and types; derived classes, inheritance, and object-oriented programming; exceptions and templates. Recommended for students who plan to take advanced courses in computer science that require familiarity with C++ or C. Students planning to take COM S 213 normally do not need to take COM S 113; 213 includes most of the material taught in 113.

COM S 214 Advanced UNIX Programming and Tools
Spring. 1 credit. S-U grade only. Prerequisite: COM S 114 or equivalent.
A focus on Unix as a programming environment for people with a basic knowledge of Unix and experience programming in at least one language. Projects cover advanced shell scripts (sh, ksh, csh), Makefiles, programming and debugging tools for C and other languages, and more modern scripting languages such as Perl and Python. Students with little or no experience with Unix should take COM S 114 first.

COM S 230 Intermediate Web Design
Spring. 3 credits. Enrollment may be limited. Prerequisite: COM S 130 or equivalent. Not offered every year; will be offered spring 2002.
Web programming requires the cooperation of two machines: the one in front of the viewer (client) and the one delivering the content (server). COM S 130 concentrates almost exclusively on the client side. The main emphasis in COM S 230 is learning about server side processing. Students begin by looking at interactions with databases, learning about querying both on paper and via SQL, and then, through a succession of projects, learn how to apply this understanding to the creation of an interactive data-driven site via the use of an integrated web site development tool such as ColdFusion. Also considered are techniques to enhance security, privacy, and reliability, and ways of incorporating other programs. Towards the end of the course, students are shown how these development tools are working. Design issues are emphasized. A major component of the course is the creation of a substantial web site.

COM S 280 Discrete Structures
Fall, spring. 4 credits. Pre- or corequisite: COM S/ENGRD 211 or permission of instructor.
Covers mathematical aspects of programming and computing. Topics are chosen from the following: mathematical induction; logical proof; propositional and predicate calculus; combinatorics and discrete mathematics covering manipulation of sums, recurrence relations, and generating-function techniques; basic number theory; sets, functions, and relations; partially ordered sets; graphs; and algebraic structures.

COM S 312 Data Structures and Functional Programming
Fall, spring. 4 credits. Prerequisite: COM S 211/212 or equivalent programming experience.
A challenging introduction to the science of programming that emphasizes data structures and alternative modes of algorithmic expression. Students learn about the advanced data structures that computer scientists use in day-to-day tasks, such as balanced trees, hash tables, and priority queues. In addition, students are exposed to alternative language models (e.g., functional programming) and alternative type systems (e.g., parametric polymorphism) to give them a broader base for understanding the principles of programming. Topics include advanced data structures, recursive and higher-order procedures, performance analysis of algorithms, models of computation, proofs of program correctness, abstract data types, polymorphic functions, and the interpretation of languages.

COM S 314 Computer Organization (also ECE 314)
Fall, spring. 4 credits. Prerequisite: COM S 211, 212; COM S 312 or ENGRD 231/ECE 232 are recommended but not required.
Basic computer organization. Topics include: performance metrics, data formats, instruction sets, addressing modes, computer arithmetic, datapath design, memory hierarchies including caches and virtual memory, I/O devices, and bus-based I/O systems. Students learn assembly language programming and design a simple pipelined processor.

COM S 321 Numerical Methods in Computational Molecular Biology (also BIO BM 321 and ENGRD 321)
Fall. 3 credits. Prerequisites: At least one course in calculus, such as MATH 106, 111, or 191 and a course in linear algebra, such as MATH 221 or 294 or BTRY 417. COM S 100 or equivalent and some familiarity with iteration, arrays, and procedures.
An introduction to numerical computing using MATLAB organized around five applications: the analysis of protein shapes, dynamics, protein folding, score functions, and field equations. Students become adept at plotting, linear equation solving, least squares fitting, and cubic spline interpolation. More advanced problem-solving techniques that involve eigenvalue analysis, the solution of ordinary and partial differential equations, linear programming, and nonlinear minimization will also be treated. The goal of the course is to develop a practical computational expertise with MATLAB and to build mathematical intuition for the problems of molecular biology. COM S majors may use only one of the following toward their degree: COM S 321, 322, or 421.

COM S 322 Introduction to Scientific Computation (also ENGRD 322)
Spring, summer. 3 credits. Prerequisites: COM S 100 and (MATH 222 or MATH 294).
An introduction to elementary numerical analysis and scientific computation. Topics include interpolation, quadrature, linear and nonlinear equation solving, least-squares fitting, and ordinary differential equations. The MATLAB computing environment is used. Vectorization, efficiency, reliability, and stability are stressed. Includes special lectures on parallel computation. COM S majors may use only one of the following toward their degree: COM S 321, 322, or 421.

COM S 324 Computational Linguistics (also COGST 424, LING 424)
Spring. 4 credits. Prerequisites: LING 203; labs involve work in the Unix environment; COM S 114 recommended.
For description, see LING 424.

COM S 381 Introduction to Theory of Computing
Fall, summer. 4 credits. Prerequisite: COM S 280 or permission of instructor. Credit will not be granted for both COM S 381 and COM S 481. Corrective transfers between COM S 381 and COM S 481 (in either direction) are encouraged during the first few weeks of instruction.
An introduction to the modern theory of computing: automata theory, formal languages, and effective computability.

COM S 392 Topics in High-level Vision (also COGST 465, PSYCH 465)
Spring. 4 credits.
For description, see PSYCH 465.

[COM S 400 The Science of Programming
Spring. 4 credits. Prerequisite: COM S 280 or equivalent. Not offered every year; next offering TBA.
The practical development of correct programs based on the conscious application of principles that are derived from a mathematical notion of program correctness. Besides dealing with conventional sequential programs, the course covers implementations of abstract data types and contains an introduction to problems with concurrency. Issues in programming-language design that arise from program correctness are discussed. Programs are written but not run on a computer.]

COM S 409 Data Structures and Algorithms for Computational Science
Spring. 4 credits. Prerequisite: COM S 211 or equivalent programming experience. This course is not open to COM S majors. Not offered every year.
Covers data structures and algorithms with emphasis on those useful for computational

science. This course is intended for students outside of the Department of Computer Science whose work involves a significant amount of computing. Topics include basic data structures as well as more advanced topics. Emphasis is placed on the use of abstract data types and on how best to select appropriate data structures.

COM S 411 Programming Languages and Logics
Fall. 4 credits. Prerequisite: COM S 312 or permission of instructor. Not offered every year.
Covers: the major concepts of programming languages, with emphasis on synthesis and interpretation; language-based programming methodologies, including object-oriented, functional, and logic programming; design and criticism of programming languages; and type theory and typed lambda-calculus. Includes exercises in several unusual programming languages.

COM S 412 Introduction to Compilers
Spring. 3 credits. Prerequisites: COM S 312 (or permission of instructor) and COM S 314. Corequisite: COM S 413.
An introduction to the specification and implementation of modern compilers. Topics covered include lexical scanning, parsing, type checking, code generation and translation, an introduction to optimization, and the implementation of modern programming languages. The course entails a substantial compiler implementation project.

COM S 413 Practicum in Compilers
Spring. 2 credits. Corequisite: COM S 412.
A compiler implementation project related to COM S 412.

COM S 414 Systems Programming and Operating Systems
Fall, spring, summer. 3 credits. Prerequisite: COM S 211, 212, 312 (or permission of instructor), and 314. Corequisite: COM S 415 in spring only.
An introduction to the logical design of systems programs, with emphasis on multiprogrammed operating systems. Topics include process synchronization, deadlock, memory management, input-output methods, information sharing, protection and security, and file systems. The impact of network and distributed computing environments on operating systems is also discussed.

COM S 415 Practicum in Operating Systems
Fall, spring. 2 credits. Corequisite: COM S 414.
The practical aspects of operating systems are studied through the design and implementation of an operating system kernel that supports multiprogramming, virtual memory, and various input-output devices. All the programming for the project is in a high-level language.

COM S 417 Computer Graphics and Visualization (also ARCH 374)
Spring. 3 credits. Prerequisite: COM S/ ENGRD 211.
An introduction to the principles of interactive computer graphics and scientific visualization. Topics include surface modeling, animation, perspective transformations, hidden-line and hidden-surface algorithms, lighting models, image synthesis, and application to scientific data analysis.

COM S 418 Practicum in Computer Graphics (also ARCH 375)
Spring. 2 credits. Enrollment limited. Prerequisites: COM S 212 and permission of instructor. Recommended: COM S 314. Corequisite: COM S 417.
Programming assignments dealing with interactive computer graphics and visualization of scientific data.

COM S 421 Numerical Analysis
Fall. 4 credits. Prerequisites: MATH 294 or equivalent, one additional mathematics course numbered 300 or above, and knowledge of programming.
Modern algorithms for systems of linear equations, systems of nonlinear equations, numerical optimization, and numerical solution of differential equations. Some discussion of methods suitable for parallel computation. This course requires more mathematical sophistication than COM S 322. COM S majors may use only one of the following toward their degree: COM S 321, 322 or 421.

COM S 430 Information Discovery
Spring. 3 credits. Prerequisite: COM S 211 or equivalent.
This course looks at the methods used to search for and discover information in digital libraries and web information systems. Methods that are covered include information retrieval, which includes: techniques for searching, browsing, and filtering information; the use of classification systems and thesauruses; and web search systems.

COM S 432 Introduction to Database Systems
Fall. 3 credits. Prerequisites: COM S 312, or 211/212, and permission of instructor. Recommended: COM S 213 and strong programming skills in C or C++.
An introduction to modern relational database systems. Concepts covered include storage structures, access methods, query languages, query processing and optimization, transaction processing, and database design theory. The course primarily covers the internals of database systems and includes four large programming assignments in C++.

COM S 433 Practicum in Database Systems
Fall. 2 credits. Corequisite: COM S 432.
An introduction to building web-database applications. Students implement a small e-commerce system using Active Server Pages, Java Server Pages, Cookies, and Servlets. The practicum also introduces technologies such as XML/XPath/XSLT and WAP.

COM S 472 Foundations of Artificial Intelligence
Fall. 3 credits. Prerequisites: COM S/ ENGRD 211 and COM S 280 (or equivalent).
A challenging introduction to the major subareas and current research directions in artificial intelligence. Topics include knowledge representation, heuristic search, problem solving, natural-language processing, game-playing, logic and deduction, planning, and machine learning.

COM S 473 Practicum in Artificial Intelligence
Fall. 2 credits. Corequisite: COM S 472.
Project portion of COM S 472. Topics include knowledge representation systems, search procedures, game-playing, automated reasoning, concept learning, reinforcement learning, neural nets, genetic algorithms, planning, and truth maintenance.

COM S 474 Introduction to Natural Language Processing (also COGST 474, LING 474)
Spring. 4 credits. Prerequisites: COM S 211.
The course presents formalisms, algorithms, and methodology for manipulating natural languages computationally. It emphasizes parts of natural language (syntax and morphology, but not semantics) where algorithms and scientific understanding make it possible for us to create and implement approximately complete accounts of linguistic phenomena and also manipulate large samples of language use (a million or a billion words). Most of the methods are not only useful for engineering applications but also advance our scientific understanding of human languages.

COM S 478 Machine Learning
Spring. 4 credits. Prerequisites: COM S 280, 312, and basic knowledge of linear algebra and probability theory.
Learning and classifying are two of our basic abilities. Machine learning is concerned with the question of how to train computers to learn from experience, to adapt and make decisions accordingly. This course introduces the set of techniques and algorithms that constitute machine learning as of today, including: inductive inference of decision trees, the parametric-based Bayesian learning approach, Bayesian belief networks and Hidden Markov Models, non-parametric methods, discriminent functions and support vector machines, neural networks, stochastic methods such as genetic algorithms, unsupervised learning and clustering, and other issues in the theory of machine learning. These techniques are used today to automate procedures that were previously performed by humans, as well as to explore untouched domains of science.

COM S 481 Introduction to Theory of Computing
Fall. 4 credits. Prerequisite: COM S 280 or permission of instructor. Credit will not be granted for both COM S 381 and 481. Corrective transfers between COM S 481 and 381 (in either direction) are encouraged during the first few weeks of instruction.
A faster-moving and deeper version of COM S 381.

COM S 482 Introduction to Analysis of Algorithms
Spring, summer. 4 credits. Prerequisites: COM S 280, 312, and either 381 or 481, or permission of instructor.
Techniques used in the creation and analysis of algorithms. Combinatorial algorithms, computational complexity, NP-completeness, and intractable problems.

COM S 483 Quantum Information Processing (also PHYS 481 and 681)
Spring. 2 credits. Prerequisite: familiarity with the theory of vector spaces over the complex numbers.
For description, see PHYS 481.

COM S 486 Applied Logic (also MATH 486)
Fall or spring. 4 credits. Prerequisites: MATH 222 or 294, COM S 280 or equivalent (such as MATH 332, 432, 434, 481), and some additional course in mathematics or theoretical computer science.

Propositional and predicate logic, compactness and completeness by tableaux, natural deduction, and resolution. Equational logic. Herbrand Universes and unification. Rewrite rules and equational logic, Knuth-Bendix method and the congruence-closure algorithm and lambda-calculus reduction strategies. Topics in Prolog, LISP, ML, or Nuprl. Applications to expert systems and program verification.

COM S 490 Independent Reading and Research
Fall, spring. 1–4 credits.
Independent reading and research for undergraduates.

COM S 501 Software Engineering
Spring. 4 credits. Prerequisite: COM S 211 or equivalent experience programming in Java or C++.
An introduction to the practical problems of specifying, designing, and building large, reliable software systems. Students work in teams on projects for real clients. This work includes a feasibility study, requirements analysis, object-oriented design, implementation, testing, and delivery to the client. Additional topics covered in lectures include professionalism, project management, and the legal framework for software development.

COM S 502 Computing Methods for Digital Libraries
Spring. 3 credits. Prerequisites: COM S 211 and some familiarity with the technology of web sites.
This course examines the application of computer science methods in digital libraries. A central topic is the representation of complex information in computer systems, including object models and metadata. Closely related topics include how to discover and deliver information over heterogeneous distributed systems and how to preserve intellectual information over worldwide networks for long periods of time. A theme that runs through the course is the interplay between computing and people, including the legal, social, and economic context.

COM S 504 Applied Systems Engineering I (also CEE 504, ECE 512, M&AE 591, OR&IE 512)
Fall. 3 credits. Prerequisite: permission of instructor. May not be used to fulfill the COM S 400+ electives.
For description, see M&AE 591.

COM S 505 Applied Systems Engineering II (also CEE 505, ECE 513, M&AE 592, OR&IE 513)
Spring. 3 credits. Prerequisite: Applied System Engineering I (CEE 504, COM S 504, ECE 512, M&AE 591, OR&IE 512). May not be used to fulfill the COM S 400+ electives.
For description, see M&AE 592.

COM S 513 System Security
Spring. 4 credits. Prerequisites: COM S 414 or 519 and familiarity with JAVA programming language.
This course discusses security and survivability for computers and communications networks. The course includes discussions of policy issues (e.g. the national debates on cryptography policy) as well as the discussions of the technical alternatives for implementing the properties that comprise "trustworthiness" in a computing system. Mechanisms for authorization and authentication as well as cryptographic protocols are covered.

COM S 514 Intermediate Computer Systems
Fall or spring. 4 credits. Prerequisites: COM S 414 or permission of instructor.
This course focuses on practical issues in designing and implementing distributed software. Topics vary depending upon instructor. Recent offerings have covered object-oriented software development methodologies and tools, distributed computing, fault-tolerant systems, and network operating systems or databases. Students undertake a substantial software project. Many students obtain additional project credit by coregistering in COM S 490, 515, or 790.

COM S 515 Practicum in Systems
Fall or spring. 1–2 credits. Corequisite: COM S 514.
The practical aspects of modern software systems are studied through the design and implementation of a significant system. Students may work alone or in teams. The project varies from year to year at the discretion of the instructor. Some students take COM S 490 or 790 instead of COM S 515.

COM S 519 Computer Networks
Spring. 4 credits. Prerequisites: COM S 314 or permission of instructor. Not offered every year.
Introduction to computer networks with an emphasis on evolving Internet standards. Detailed introduction to networking protocols for reliable data transfer, flow control, congestion control, naming and addressing, routing, error control, and multiple access. Fundamentals of layered protocols and techniques for protocol design and implementation. The course is project-oriented and requires substantial programming experience.

COM S 522 Computational Tools and Methods for Finance
Spring. 4 credits. Prerequisites: programming experience (e.g., C, FORTRAN, or MATLAB), some knowledge of numerical methods, especially numerical linear algebra. Not offered every year.
This course provides a hands-on introduction to computational methods and tools used in finance. Students study both the underlying methods and efficient implementation. The MATLAB Financial Toolbox, along with additional MATLAB tools, are used extensively. The underlying numerical techniques discussed include: nonlinear least-squares procedures (regression), basic linear algebra, linear and nonlinear optimization, finite-difference methods for PDEs, quadratic programming (and linear complementarity problems), and specialized tree (and lattice) evaluation methods.

COM S 574 Heuristic Methods for Optimization (also CEE 509)
Spring. 3 or 4 credits. Prerequisites: COM S/ENGRD 211 or 322 or CEE/ENGRD 241, or graduate standing, or permission of instructor. Not offered every year.
This course describes a variety of heuristic search methods including simulated annealing, tabu search, genetic algorithms, derandomized evolution strategy, random walk, and direct search algorithms. Algorithms are used to find values of discrete and/or continuous variables arising in optimization and model fitting. Applications are discussed in a range of areas including some of the following: artificial intelligence, scheduling, protein folding, economic planning, water quality protection, telecommunications, and robotics. The advantages and disadvantages of heuristic search methods for both serial and parallel computation are discussed in comparison to other optimization algorithms.

COM S 601 System Concepts
Fall. 3 credits. Prerequisites: open to students enrolled in the COM S Ph.D. program.
This course teaches broadly applicable principles of computing system design and analysis. For example, the principle of locality of reference used in caching, virtual memory, and network service hints. Such broadly applicable abstractions are discussed along with their implementations in a variety of settings. Case studies from the systems literature are employed throughout.

COM S 611 Advanced Programming Languages
Fall. 4 credits. Graduate standing or permission of instructor.
A study of programming paradigms: functional, imperative, concurrent, and logic programming. Models of programming languages, including the lambda calculus. Type systems, polymorphism, modules, and other object-oriented constructs. Program transformations, programming logic, and applications to programming methodology.

COM S 612 Compiler Design for High-Performance Architectures
Spring. 4 credits. Prerequisites: COM S 314 and 412 or permission of instructor.
Compiler design for pipelined and parallel architectures. Program analysis: data and control dependencies, dataflow analysis, efficient solution of dataflow equations, dependence tests, solution of Diophantine equations. Architecture and code generation for instruction-level parallel (ILP) processors: pipelined, VLIW and superscalar architectures, code reorganization and software pipelining. Architecture and code generation for multiprocessors: shared- and distributed-memory architectures, latency tolerance and avoidance, loop transformations to enhance parallelism and locality of reference.

COM S 613 Concurrent Programming
Spring. 4 credits. Prerequisite: COM S 414 or permission of instructor. Not offered every year.
Advanced techniques in, and models of, concurrent systems. Covers synchronization of concurrent processes; parallel programming languages; deadlock; and verification.

COM S 614 Advanced Systems
Spring. 4 credits. Prerequisite: COM S 414 or permission of instructor.
An advanced course in systems, emphasizing contemporary research in distributed systems. Topics may include communication protocols, consistency in distributed systems, fault-tolerance, knowledge and knowledge-based protocols, performance, scheduling, concurrency control, and authentication and security issues.

COM S 615 Adaptive Systems
Fall. 4 credits. Prerequisites: COM S 614 recommended.
This course examines adaptation in operating systems and applications. It focuses mainly on extensible systems, that is, systems whose interface or implementation can be modified dynamically by applications to suit application-specific needs. This discussion is supplemented with examples of domain-

specific adaptation drawn from mobile computing.

COM S 621 Matrix Computations
Fall. 4 credits. Prerequisites: MATH 411 and 431 or permission of instructor.
Stable and efficient algorithms for linear equations, least squares, and eigenvalue problems. Direct and iterative methods are considered. The MATLAB system is used extensively.

[COM S 622 Numerical Optimization and Nonlinear Algebraic Equations
Spring. 4 credits. Prerequisite: COM S 621. Offered odd-numbered years only.
Modern algorithms for the numerical solution of multidimensional optimization problems and simultaneous nonlinear algebraic equations. Emphasis is on efficient, stable, and reliable numerical techniques with strong global convergence properties: quasi-Newton methods, modified Newton algorithms, and trust-region procedures. Special topics may include large-scale optimization, quadratic programming, and numerical approximation.]

COM S 624 Numerical Solution of Differential Equations
Spring. 4 credits. Prerequisites: previous exposure to numerical analysis (e.g., COM S 421 or 621) and differential equations, and knowledge of MATLAB. Offered in even-numbered years.
Finite difference methods for the solution of ordinary and partial differential equations. A fast-moving course that begins with a three-week survey of numerical methods for ODEs, then moves on to Fourier analysis and methods for PDEs, especially parabolic and hyperbolic equations. Other topics covered include numerical stability, finite element methods, Hamiltonian problems, and computational issues such as mesh generation and sparse matrix computation for PDES.

COM S 626 Computational Molecular Biology
Spring. 4 credits. Prerequisites: familiarity with linear programming, numerical solutions of ordinary differential equations and nonlinear optimization methods.
Problems and algorithms in computational molecular biology. Topics include: sequences (alignment, scoring functions, complexity of searches and alignment, secondary structure prediction, families, and function), the protein folding problem (lattice models, lattice searches, the HP model, chemical potentials, statistical potentials, funnels, complexity and model verification, global optimization, homology, threading), and the dynamics of complex biosystems (the Molecular Dynamics method, long range forces, statistics of flexible systems, reduced models).

COM S 632 Advanced Database Systems
Spring. 4 credits. Prerequisite: COM S 432/433 or permission of instructor.
A variety of advanced issues ranging from transaction management to query processing to data mining. Involves extensive paper reading and discussion. Development of a term project with research content is required.

COM S 664 Machine Vision
Fall or spring. 4 credits. Prerequisites: undergraduate-level understanding of algorithms and MATH 221 or equivalent.
An introduction to computer vision, with an emphasis on discrete optimization algorithms and on applications in medical imaging. The following topics are covered: edge detection, image segmentation, stereopsis, motion and optical flow, active contours, and the Hausdorff distance. Students are required to implement several of the algorithms covered in the course and complete a final project.

COM S 671 Introduction to Automated Reasoning
Fall. 4 credits. Prerequisite: (COM S 611 and graduate standing) or permission of instructor.
Topics in modern logic needed to understand and use automated reasoning systems such as HOL, Nuprl, and PVS. Special emphasis is on type theory and logic and on tactic-oriented theorem proving.

COM S 672 Advanced Artificial Intelligence
Spring. 4 credits. Prerequisites: COM S 472 or permission of instructor.
Artificial intelligence (AI) provides many computational challenges. This course covers a variety of areas in AI, including knowledge representation, automated reasoning, learning, game-playing, and planning, with an emphasis on computational issues. Specific topics include stochastic reasoning and search procedures, properties of problem encodings, issues of syntax and semantics in knowledge representation, constraint satisfaction methods and search procedures, and critically constrained problems and their relation to phase-transition phenomena. In addition, connections between artificial intelligence and other fields, such as statistical physics, operations research, and cognitive science are explored.

COM S 674 Natural Language Understanding
Spring. 3 credits. Prerequisites: COM S 472 or permission of instructor. Not offered every year.
This course presents an introduction to natural language processing, the primary concern of which is the study of human language use from a computational perspective. The course covers syntactic analysis, semantic interpretation, and discourse processing, via symbolic and statistical approaches. Possible topics include information extraction, natural language generation, memory models, ambiguity resolution, finite-state methods, mildly context-sensitive formalisms, deductive approaches to interpretation, machine translation, and machine learning of natural language.

[COM S 676 Reasoning about Knowledge
Fall. 4 credits. Prerequisites: mathematical maturity and an acquaintance with propositional logic. Offered even-numbered years; not offered 2001–2002.
Knowledge plays a crucial role in distributed systems, game theory, and artificial intelligence. Material examines formalizing reasoning about knowledge and the extent to which knowledge is applicable to those areas. Issues include: common knowledge, knowledge-based programs, applying knowledge to analyzing distributed systems, attainable states of knowledge, modeling resource-bounded reasoning, and connections to game theory.]

[COM S 677 Reasoning about Uncertainty
Fall. 4 credits. Prerequisites: mathematical maturity and an acquaintance with propositional logic. Not offered 2001–2002.
Examines formalizing reasoning about and representing uncertainty, using formal logical approaches as a basis. Topics: logics of probability, combining knowledge and probability, probability and adversaries, conditional logics of normality, Bayesian networks, qualitative approaches to uncertainty, going from statistical information to degrees of belief, and decision theory.]

COM S 681 Analysis of Algorithms
Fall. 4 credits. Prerequisite: COM S 482 or graduate standing.
Methodology for developing efficient algorithms, primarily for graph theoretic problems. Understanding of the inherent complexity of natural problems via polynomial-time algorithms, randomized algorithms, NP-completeness, and randomized reducibilities. Also covers topics such as parallel algorithms and efficient data structures.

COM S 682 Theory of Computing
Spring. 4 credits. Prerequisite: (COM S 381 or 481) and (COM S 482 or 681) or permission of instructor.
Advanced treatment of theory of computation, computational-complexity theory, and other topics in computing theory.

COM S 683 Advanced Design and Analysis of Algorithms
Spring. 4 credits. Prerequisites: COM S 681 or permission of instructor.
An advanced study of current topics in the design of discrete algorithms. Topics include randomization, clustering and graph partitioning, and techniques from high-dimensional geometry. The course emphasizes algorithmic problems in a range of areas including networks, large datasets, lattices, and the design of heuristics.

COM S 684 Approximation and Network Algorithms
Fall. 4 credits. Prerequisites: COM S 681 or permission of instructor.
An advanced study of current topics in the design of discrete algorithms. Topics include network flow algorithms, development of approximation algorithms for computationally intractable problems, role of game-theoretic concepts in algorithms, lattices, and the use of linear programming in combinatorial optimization. The course emphasizes algorithmic problems in a range of areas including networks, large datasets, and the design of heuristics.

COM S 686 Logics of Programs
Spring. 4 credits. Prerequisites: COM S 481, 682, and MATH 481 or MATH/COM S 486.
Topics in logics of programs and program verification. Possible topics include: Floyd/Hoare logic, modal logic, dynamic logic, temporal logic, process logic, automata on infinite objects and their relation to program logics, the Rabin tree theorem, the modal mu-calculus, games and alternating automata, applications to type inference, set constraints, and Kleene algebra.

COM S 709 Computer Science Colloquium
Fall, spring. 1 credit. S-U grades only. For staff, visitors, and graduate students interested in computer science.
A weekly meeting for the discussion and study of important topics in the field.

COM S 713 Seminar in Systems and Methodology
Fall, spring. 4 credits. Prerequisites: a graduate course employing formal reasoning such as COM S 611, 613, 671, a logic course, or permission of instructor. Not offered every year.
Discussion of contemporary issues in the design and analysis of computing systems. Emphasis is on the proper use of rigor, models, and formalism.

COM S 715 Seminar in Programming Refinement Logics
Fall, spring. 4 credits. Prerequisite: permission of instructor.
Topics in programming logics, possibly including type theory, constructive logic, decision procedures, heuristic methods, extraction of code from proofs, and the design of proof-development and problem-solving systems.

COM S 717 Topics in Parallel Architectures
Fall. 4 credits. Prerequisite: COM S 612 or permission of instructor. Not offered every year.
Covers topics in parallel computers. Material includes: architectures of parallel computers, parallelizing compilers, operating systems for parallel computers, and languages (functional and logic-programming languages) designed for parallel computation.

COM S 719 Seminar in Programming Languages
Fall, spring. 4 credits. Prerequisite: COM S 611 or permission of instructor. S-U grades only.

COM S 721 Topics in Numerical Analysis
Fall, spring. 4 credits. Prerequisite: COM S 621 or 622 or permission of instructor. Not offered every year; semester TBA.
Topics are chosen at instructor's discretion.

COM S 726 Problems in Computational Molecular Biology (also PL BR 726)
Fall, spring. 1 credit. S-U grades only.

COM S 732 Seminar in Database Systems
Fall, spring. 4 credits. S-U grades only.

COM S 754 Systems Research Seminar
Fall, spring. 1 credit. S-U grades only.

COM S 772 Seminar in Artificial Intelligence
Fall, spring. 4 credits. Prerequisites: permission of instructor. S-U grades only.

[COM S 773/774 Proseminar in Cognitive Studies I & II (also COGST, PHIL, LING, and PSYCH 773/774)
Fall, 773; spring, 774. 4 credits. Not offered 2001–2002.
For description, see COGST 773/774.]

COM S 775 Seminar in Natural Language Understanding
Fall, spring. 2 credits.
Informal weekly seminar in which current topics in natural language understanding and computational linguistics are discussed.

COM S 789 Seminar in Theory of Algorithms and Computing
Fall, spring. 4 credits. Prerequisite: permission of instructor. S-U grades only.

COM S 790 Special Investigations in Computer Science
Fall, spring. Prerequisite: permission of a computer science adviser. Letter grade only.
Independent research or Master of Engineering project.

COM S 890 Special Investigations in Computer Science
Fall, spring. Prerequisite: permission of a computer science adviser. S-U grades only.
Master of Science degree research.

COM S 990 Special Investigations in Computer Science
Fall, spring. Prerequisite: permission of a computer science adviser. S-U grades only.
Doctoral research.

EARTH AND ATMOSPHERIC SCIENCES

(Course listings formerly under Geological Sciences and Soil, Crop, and Atmospheric Sciences)

Courses

For complete course descriptions, see the Earth and Atmospheric Sciences listing in the College of Arts and Sciences or the College of Agriculture and Life Sciences section.

EAS 101 Introductory Geological Sciences
Fall, spring, summer. 3 credits. Fall, spring, A. Moore; summer, W. Brice.

EAS 102 Evolution of the Earth and Life (also offered as BIO G 170)
Spring. 3 credits. J. L. Cisne.

EAS 104 The Sea: An Introduction to Oceanography (also offered as BIO EE 154)
Spring, summer. 3–4 credits (4 credits with lab section). Spring: C. H. Greene, W. M. White; summer: J. Chiment.

EAS 105 Writing on Rocks (First-Year Writing Seminar)
Fall, spring. 3 credits. J. Chiment.
See First-Year Seminar Handbook for description.

EAS 106 Vertebrate Fossil Preparation
Fall, spring. 1 credit. S-U grades only. Prerequisites: 1 introductory geology course or concurrent enrollment, class size is limited. J. Chiment.

EAS 107 How the Earth Works
Fall. 1 credit. J. L. Cisne.

EAS 109 Dinosaurs
Fall. 1 credit. J. L. Cisne.

EAS 111 To Know the Earth and Build a Habitable Planet
Fall. 3 credits. J. M. Bird.

EAS 122 Earthquake!
Spring. 3 credits. L. D. Brown.
This is a course in the Introduction to Engineering series. For description, see ENGRI 122.

EAS 131 Basic Principles of Meteorology
Fall. 3 credits. M. W. Wysocki.

EAS 150 Introduction to Fortran Programming
Fall. 3 credits. M. W. Wysocki.

EAS 200 Art, Archaeology, and Analysis (also offered as ARKEO 285, ARTH 200, ENGRI 185, or PHYS 200)
Spring. 3 credits. R. W. Kay.
This is a course in the Introduction to Engineering series. For description, see ENGRI 185.

EAS 201 Introduction to the Physics and Chemistry of the Earth (also offered as ENGRD 201)
Fall. 3 credits. Prerequisites: PHYS 112 or 207. L. M. Cathles.

[EAS 203 Natural Hazards and the Science of Complexity
Fall. 3 credits. Prerequisites: 1 calculus course. Not offered 2001–2002.
D. L. Turcotte.]

EAS 210 Introduction to Field Methods in Geological Sciences
Fall. 3 credits. Prerequisites: EAS 101 or 201, or permission of instructor. 1 lecture, Saturday field trips. R. W. Allmendinger.

EAS 212 Caribbean Field Trip
Spring. 2 credits. Prerequisite: permission of instructor. Enrollment limited to 15. Approximate cost $1,100. L. D. Brown.

EAS 213 Marine and Coastal Geology
Summer. 2 credits. Prerequisite: an introductory course in geology or permission of instructor. Staff.

EAS 250 Meteorological Observations and Instruments
Spring. 3 credits. Prerequisite: EAS 131. M. W. Wysocki.

EAS 260 Soil Science (also CSS 260)
Fall. 4 credits. S. J. Riha.

EAS 268 Climate and Global Warming
Spring. 3 credits. A. T. DeGaetano.

EAS 296 Forecast Competition
Fall and spring. 1 credit. S-U grades only. Prerequisite: sophomore undergraduate standing in atmospheric science, or permission of instructor. D. S. Wilks.

EAS 302 Evolution of the Earth System
Spring. 4 credits. Prerequisites: MATH 112 or 192 and CHEM 207 or equivalent. W. M. White, W. D. Allmon, B. L. Isacks.

EAS 315 Geomorphology
Fall. 4 credits. Prerequisite: one course in geology, hydrology, or soil science. T. E. Jordan and B. L. Isacks.

EAS 321 Introduction to Biogeochemistry (also offered as NTRES 321)
Fall. 4 credits. Prerequisites: CHEM 207, MATH 112, plus a course in biology and/or geology. L. A. Derry, J. Yavitt.

EAS 326 Structural Geology
Spring. 4 credits. Prerequisite: MATH 112, EAS 101, or 201, or permission of instructor. R. W. Allmendinger.

EAS 331 Climate Dynamics (also offered as ASTRO 331)
Fall. 4 credits. Prerequisite: MATH 112 or 192 or equivalent. K. H. Cook, P. J. Gierasch.

EAS 334 Microclimatology
Spring. 3 credits. Prerequisite: a course in physics. Offered alternate years. D. S. Wilks.

EAS 341 Atmospheric Thermodynamics and Hydrostatics
Fall. 3 credits. Prerequisites: 1 year of calculus and 1 semester of physics. M. M. Wysocki.

EAS 342 Atmospheric Dynamics
Spring 3 credits. Prerequisites: 1 year each of calculus and physics. K. H. Cook, and P. J. Gierasch.

EAS 352 Synoptic Meteorology I
Spring. 3 credits. Prerequisites: EAS 341 and concurrent enrollment in EAS 342. M. W. Wysocki.

EAS 355 Mineralogy
Fall. 4 credits. Prerequisite: EAS 101 or 201 and CHEM 207 or permission of instructor. S. Mahlburg Kay.

EAS 356 Petrology and Geochemistry
Spring. 4 credits. Prerequisite: EAS 355. R. W. Kay.

EAS 375 Sedimentology and Stratigraphy
Fall. 4 credits. Prerequisite: EAS 101 or 201. J. L. Cisne.

EAS 388 Geophysics and Geotectonics
Spring. 4 credits. Prerequisites: MATH 192 (or 112) and PHYS 208 or 213. B. L. Isacks.

EAS 417 Field Mapping in Argentina
Summer. 3 credits. Prerequisites: EAS 210 and 326; Spanish desirable, but not required. S. Mahlburg Kay.

EAS 434 Reflection Seismology
Fall. 4 credits. Prerequisites: MATH 192 and PHY 208, 213, or equivalent. L. D. Brown.

EAS 435 Statistical Methods in Meteorology and Climatology
Fall. 3 credits. Prerequisites: an introductory course in statistics (e.g., AEM 210) and calculus. D. S. Wilks.

EAS 437 Geophysical Field Methods
Fall. 3 credits. Prerequisite: PHYS 213 or 208, or permission of instructor. L. D. Brown.

EAS 447 Physical Meteorology
Fall. 3 credits. Prerequisites: 1 year each of calculus and physics. Offered alternate years. A. T. DeGaetano.

EAS 451 Synoptic Meteorology II
Fall. 3 credits. Prerequisites: EAS 341 and 342. S. J. Colucci.

[EAS 453 Advanced Petrology
Fall. 3 credits. Prerequisite: EAS 356. Offered alternate years. Not offered 2001–2002. R. W. Kay.]

EAS 454 Advanced Mineralogy
Spring. 3 credits. Prerequisite: EAS 355 or permission of instructor. Offered alternate years. S. M. Kay.

EAS 455 Geochemistry
Fall. 4 credits. Prerequisites: CHEM 207 and MATH 192 or equivalent. Recommended: EAS 356. Offered alternate years. W. M. White.

EAS 456 Mesoscale Meteorology
Spring. 3 credits. Prerequisites: EAS 341 and 342 or permission of instructor. Offered alternate years.

[EAS 457 Atmospheric Air Pollution
Fall. 3 credits. Prerequisites: EAS 341 or 1 course in thermodynamics, and one semester of chemistry, or permission of instructor. Offered alternate years. Not offered 2001–2002. M. W. Wysocki.]

EAS 458 Volcanology
Spring. 3 credits. Corequisite: EAS 356 or equivalent. Offered alternate years. R. W. Kay and W. M. White.

[EAS 462 Marine Ecology (also offered as BIOEE 462)
Spring. 3 credits. Limited to 75 students. Prerequisite: BIOEE 261. Offered alternate years. Not offered 2001–2002. C. D. Harvell, C. H. Greene.]

EAS 475 Special Topics in Oceanography
Spring, summer. 2–5 var. credits. Prerequisites: EAS 104 or BIOEE 154, and permission of instructor. C. H. Greene.

[EAS 476 Sedimentary Basins: Tectonics and Mechanics
Fall. 3 credits. Offered alternate years. Prerequisite: EAS 375 or permission of instructor. Not offered 2001–2002. T. E. Jordan.]

EAS 478 Advanced Stratigraphy
Fall. 3 credits. Prerequisite: EAS 375 or permission of instructor. Offered alternate years. T. E. Jordan.

EAS 479 Paleobiology (also offered as BIOEE 479)
Fall. 4 credits. Prerequisites: 1 year of introductory biology for majors and either BIOEE 274, 373, EAS 375, or permission of instructor. W. Allmon.

EAS 481 Senior Survey of Earth Systems
Fall. 3 credits. Limited to seniors majoring in geological science. J. M. Bird.

[EAS 483 Environmental Biophysics
Spring. 3 credits. Prerequisite: EAS/CSS 260 or equivalent, or permission of instructor. Offered alternate years. Not offered 2001–2002. S. J. Riha.]

EAS 491–492 Undergraduate Research
Fall, spring. 1–4 credits. Staff.

EAS 494 Special Topics in Atmospheric Science
Fall, spring. 8 credits maximum. S-U grades optional. Undergraduate level.

EAS 496 Internship Experience
Fall, spring. 1–2 credits. S-U grades only.

EAS 497 Individual Study in Atmospheric Science
Fall, spring. 1–6 credits. S-U grades optional. Students must register with an Independent Study form.

EAS 498 Teaching Experience in Atmospheric Science
Fall, spring. 1–5 credits. S-U grades optional. Students must register with an Independent Study form.

EAS 499 Undergraduate Research in Atmospheric Science
Fall, spring. Credit by arrangement. Students must register with an Independent Study form.

EAS 500 Design Project in Geohydrology
Fall, spring. 3–12 credits. An alternative to an industrial project for M.Eng. students choosing the geohydrology option. May continue over two or more semesters. L. M. Cathles.

EAS 502 Case Histories in Groundwater Analysis
Spring. 4 credits. L. M. Cathles.

EAS 622 Advanced Structural Geology I
Spring. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years. R. W. Allmendinger.

[EAS 624 Advanced Structural Geology II
Spring. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years; not offered 2001–2002. R. W. Allmendinger.]

EAS 628 Geology of Orogenic Belts
Spring. 3 credits. Prerequisite: permission of instructor. J. M. Bird.

[EAS 634 Advanced Geophysics I: Fractals and Chaos in Geology and Geophysics
Spring. 3 credits. Prerequisite: EAS 388 or permission of instructor. Offered alternate years; Not offered 2001–2002. D. L. Turcotte.]

EAS 635 Advanced Statistical Meteorology and Climatology
Fall. 3 credits. Prerequisites: coursework in or elementary knowledge of statistics, calculus, matrix algebra, and computer programming. D. S. Wilks.

[EAS 636 Advanced Geophysics II: Quantitative Geodynamics
Spring. 3 credits. Prerequisite: EAS 388 or permission of instructor. Offered alternate years. Not offered 2001–2002. D. L. Turcotte.]

[EAS 641 Analysis of Biogeochemical Systems
Spring. 3 credits. Prerequisite: MATH 293 or permission of instructor. Offered alternate years. Not offered 2001–2002. L. A. Derry.]

[EAS 651 Atmospheric Physics (also ASTRO 651)
Fall. 3 credits. Prerequisites: EAS 341 and 342 or permission of instructor. Offered alternate years. Not offered 2001–2002. K. H. Cook, P. J. Gierasch, S. J. Colucci.]

[EAS 652 Advanced Atmospheric Dynamics
Spring. 3 credits. Prerequisites: EAS 341 and 342 or permission of instructor. Offered alternate years. Not offered 2001–2002. S. J. Colucci, K. H. Cook, P. J. Gierasch.]

EAS 656 Isotope Geochemistry
Spring. 3 credits. Open to undergraduates. Prerequisite: EAS 455 or permission of instructor. Offered alternate years. W. M. White.

EAS 675 Modeling the Soil-Plant-Atmosphere System
Spring. 3 credits. Prerequisite: EAS/CSS 483 or equivalent. Offered alternate years. S. J. Riha.

EAS 692 Special Topics in Atmospheric Science
Fall, spring. 1–6 credits. S-U grades optional. Staff.

EAS 695 Computer Methods in Geological Sciences
Fall, spring. 3 credits. L. Brown, B. L. Isacks.

EAS 700–799 Seminars and Special Work
Fall, spring. 1–3 credits. Prerequisite: permission of instructor. Staff.
Advanced work on original investigations in earth and atmospheric sciences. Topics change from term to term.

EAS 722 Advanced Topics in Structural Geology
R. W. Allmendinger.

EAS 731 Plate Tectonics and Geology
J. M. Bird.

[EAS 733 Fractals and Chaos—Independent Studies
Not offered 2001–2002. D. L. Turcotte.]

EAS 751 Petrology and Geochemistry
R. W. Kay.

EAS 755 Advanced Topics in Petrology and Geochemistry
J. M. Bird, W. A. Bassett.

EAS 757 Current Research in Petrology and Geochemistry
S. Mahlburg Kay, R. W. Kay.

EAS 762 Advanced Topics in Paleobiology
W. D. Allmon.

EAS 771 Advanced Topics in Sedimentology and Stratigraphy
T. E. Jordan.

EAS 773 Paleobiology
J. L. Cisne.

EAS 775 Advanced Topics in Oceanography
Spring. C. H. Greene.

EAS 780 Earthquake Record Reading
Fall. M. Barazangi.

EAS 781 Geophysics, Exploration, Seismology
L. D. Brown.

EAS 783 Advanced Topics in Geophysics
B. L. Isacks.

EAS 789 Lithospheric Seismology
L. D. Brown. COCORP Seminar.

EAS 793 Andes-Himalaya Seminar
S. Mahlburg Kay, R. W. Allmendinger, B. L. Isacks, T. E. Jordan.

EAS 795 Low Temperature Geochemistry
Offered spring 2001 only. L. A. Derry.

EAS 796 Geochemistry of the Solid Earth
W. M. White.

EAS 797 Fluid-Rock Interactions
L. M. Cathles.

EAS 799 Soil, Water, and Geology Seminar
L. M. Cathles, T. S. Steenhuis.

EAS 850 Master's-Level Thesis Research in Atmospheric Science
Fall, spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.

EAS 950 Graduate-Level Dissertation Research in Atmospheric Science
Fall, spring. Credit by arrangement. S-U grades optional. Hours by arrangement. Graduate faculty.

EAS 951 Doctoral-Level Dissertation Research in Atmospheric Science
Fall, spring. Credit by arrangement. S-U grades optional. Hours by arrangement. Graduate faculty.

ELECTRICAL AND COMPUTER ENGINEERING

ECE 198 Introduction to the Electronic Revolution (also ENGRG 198)
Summer only. 3 credits. Cannot be taken in addition to ENGRG 298.
For description, see ENGRG 198.

ECE 210 Introduction to Circuits for Electrical and Computer Engineers (also ENGRD 210)
Fall, spring. 3 credits. Corequisites: MATH 293 and PHYS 213. C. E. Seyler.
For description, see ENGRD 210.

ECE 215 Introductory Integrated Circuits Laboratory
Fall, spring. 1 credit. Pre- or corequisite: ENGRD 210. A. Phillips, Jr.
Laboratory course to develop skills with modern instrumentation, and to explore the design and operation of electrical circuits used in computers, amplifiers, and signal processing.

ECE 232 Digital Systems Design Laboratory
Fall, spring. 1 credit. Pre- or corequisite: ENGRD 231. W. E. Speight.
An introduction to digital systems design using computer-aided design (CAD) tools. Students complete a sequence of eight experiments covering combinational logic, sequential circuits, counters, data transfer and microcontroller design. Hands-on experience is provided by designing, implementing and testing an 8 bit microcontroller using a field programmable gate array (FPGA).

ECE 250 Technology in Society (also ENGRG 250, HIST 250 and S&TS 250)
Fall. 3 credits. A humanities elective for engineering students. R. R. Kline.
For description, see ENGRG 250.

ECE 291–292 Sophomore Electrical and Computer Engineering Project
Fall, 291; spring, 292. 1–8 credits. Limited to sophomores in Engineering. Staff.
Individual study, analysis, and, usually, experimental tests in connection with a special engineering problem chosen by the student after consultation with the faculty member directing the project. An engineering report on the project is required. Students must make individual arrangements with a faculty sponsor prior to registration and submit a request for Independent Project form to the Electrical and Computer Engineering Undergraduate Office.

ECE 298 Inventing an Information Society (also ENGRG 298 and S&TS 292)
Spring. 3 credits. Approved for humanities distribution.
For description, see ENGRG 298.

ECE 301 Signals and Systems I
Fall, summer. 4 credits. Prerequisites: a grade of at least C+ in ENGRD 210, and C in MATH 293 and 294. D. F. Delchamps.
Covers: continuous-time signals and linear time-invariant systems, continuous-time convolution and impulse response, Fourier series and transforms of continuous-time signals, the Sampling Theorem, amplitude modulation and time- and frequency-division multiplexing, bilateral Laplace transforms and applications, and discrete-time convolution and z-transforms with applications to discrete-time linear time-invariant systems.

ECE 302 Signals and Systems II: Discrete-Time Systems and Signal Processing
Spring. 4 credits. Prerequisite: ECE 301. D. F. Delchamps.
Review of discrete-time convolution and bilateral z-transforms with discrete-time linear time-invariant systems applications. Unilateral z-transforms and difference equations. Discrete-time Fourier transforms. Sampling and reconstruction of continuous-time signals. DFTs and FFTs and attendant computational issues. Introduction to digital filter design techniques with special emphasis on: linear-phase FIR filters; FIR filter design using windowing, frequency sampling, and least squares; and IIR filter design using impulse invariance and bilinear transformation.

ECE 303 Electromagnetic Fields and Waves
Fall, summer. 4 credits. Prerequisites: grades of C or better in PHYS 213, 214, and MATH 294. M. C. Kelley.
Maxwell's equations in differential form; wave equation; plane electromagnetic waves; phase and group velocities; Poynting's theorem, complex dielectric constant; wave reflection and transmission; guided waves on transmission lines; transient pulse propagation; and elementary dipole antenna; analysis of wireless communication links.

ECE 306 Fundamentals of Quantum and Solid-State Electronics
Spring. 4 credits. Prerequisites: PHYS 214 and MATH 294. C. L. Tang.
Introductory quantum mechanics and solid-state physics necessary for modern solid-state electronic devices. Topics include the formalism and methods of quantum mechanics, the hydrogen atom, the structure of simple solids, energy bands, Fermi-Dirac statistics, and the basic physics of semiconductors. Applications include quantum wells and the p-n junction.

ECE 310 Introduction to Probability and Random Signals
Spring. 4 credits. Prerequisite: MATH 294. This course may be used in place of ENGRD 270 to help satisfy the engineering distribution requirement. T. L. Fine.
Introduction to the theory of probability as a basis for modeling random phenomena and signals, calculating the response of systems, and making estimates, inferences, and decisions in the presence of chance and uncertainty. Applications are given in such areas as communications, and device modeling, probability, and characteristic functions; nonlinear transformations of data; expectation and correlation; and the central limit theorem.

ECE 311 Electrical and Computer Engineering Honors Seminar
Spring. 2 credits variable. A. P. Reeves.
Students registered for this course are required to attend all of the colloquia lectures. Summary papers are required. Honors students who take the seminar for letter grade are required to write two summary papers for two credits. Non-honors students, who must take the seminar pass/fail, are required to write one summary paper for one credit. Each summary paper reviews a topic presented during the term.

ECE 314 Computer Organization (also COM S 314)
Spring. 4 credits. Prerequisites: COM S/ ENGRD 211 or ENGRD 231/ECE 232 are required. Fall, J. G. Morrisett; spring, M. A. Heinrich.
Course description for spring offering: basic computer organization. Topics include performance metrics, data formats, instruction sets, addressing modes, computer arithmetic, microcoded and pipelined datapath design, memory hierarchies including caches and virtual memory, I/O devices, bus-based I/O systems. Students learn assembly language programming and design a simple pipelined processor. For fall description, see COM S 314.

ECE 315 Introduction to Microelectronics
Fall, spring. 4 credits. Prerequisites: ECE 210 and ECE 215. Fall, J. M. Ballantyne; spring, J. R. Shealy.
Design of digital and analog electronic circuits in the context of modern integrated circuit technology. Course coverage includes the building blocks of integrated circuits: introductory physics of semiconductors, MOS and junction transistors; digital electronics—inverters, logic circuits and memory; and analog circuits—multi-stage and differential amplifiers.

ECE 318 Electronic Power Switching Circuits
Summer only. 3 credits. Limited to 24 engineering coop students. J. C. Belina.
This course covers the basic theory and practice for the control of power using transistorized switching techniques. The primary application is high-efficiency audio amplifier design. Topics include: transistors in linear-mode and switching-mode, power regulation: linear vs. switching, audio amplifier architectures, pulse width modulation (PWM) and the H-Bridge, distortion reduction techniques and feedback, and integrated options for audio amplification: powered subwoofers. Taught at the level of *Electronic Circuits* by N. R. Malik.

[ECE 328 Dynamic Systems in Communication and Control
Spring. 3 credits. Prerequisite: ECE 301. Not offered 2001–2002.
Task-driven introduction to discrete-time dynamic system analysis and design, with emphasis on digital communication and control systems. Format is to introduce a particular design task, abstract it to a linear algebra problem, solve it numerically using MATLAB, and study solution in terms of original application. Applications of interest: network and modem echo cancellation for full-duplex transmission, terrestrial microwave radio channel multipath equalization for wireless communication, satellite-tracking antenna azimuth control, and effect of re-transmit protocols on distribution of steady-state communication network flows.]

ECE 391–392 Junior Electrical and Computer Engineering Project
Fall, 391; spring, 392. 1–8 credits. Limited to juniors in Engineering.
Individual study, analysis, and, usually, experimental tests in connection with a special engineering problem chosen by the student after consultation with the faculty member directing the project. An engineering report on the project is required. Students must make individual arrangements with a faculty sponsor prior to registration and submit a Request for Independent Project form to the Electrical Engineering Undergraduate Office.

ECE 400 Practicum in Systems Engineering
Spring. 3 credits. 1 credit of Engineering Design.
Concepts involved with bringing an engineered product to reality. The course employs techniques from Systems Engineering along with a knowledge of the Internet, computer networks, microprocessor systems, and semiconductor devices, to create a plan for a specific engineered product: a wireless home theatre, control, and monitoring device. Students gain a working knowledge of system design concepts including product cycle, design cycle, product specification, UL safety issues, new product testing, RFI, and product test. They develop the full details of a business plan through product launch and support. A final team product mock-up is required as are weekly team presentations. Teams must contain students from ECE, M&AE, OR&IE, and COM S. Each 490 student must also present at least one weekly lecture on an assigned topic.

ECE 403 Introduction to Nuclear Science and Engineering (also A&EP 403, M&AE 458, and NS&E 403)
Fall. 3 credits. Prerequisites: PHYS 214 and MATH 294. K. B. Cady.
For description, see NS&E 403.

ECE 411 Random Signals in Communications and Signal Processing
Fall. 3 credits. Prerequisite: ECE 301 and 310 or equivalent. T. Berger.
Introduction to models for random signals in discrete and continuous time; Markov chains, Poisson process, queuing processes, power spectral densities, Gaussian random process. Response of linear systems to random signals. Elements of estimation and inference as they arise in communications and digital signal processing systems.

ECE 412–413 Hybrid Electric Vehicle
Spring, 412; fall, 413. 1–4 credits.
J. R. Callister.
The Cornell Hybrid Electric Vehicle (CUHEV) Project focuses on the design, development, testing, and competition of a Hybrid Electric Vehicle through a team structure. Students work in teams that include powertrain, business, fairing, ergonomics, control, alternate power unit, and suspension. Students are required to design an entire vehicle and to plan and execute its manufacture. The vehicle is competed in a national competition, usually in late May each year. There are two to three design reviews, weekly presentations and team leader meetings in addition to any meetings the teams require to complete the project. There is a team selection process so students interested in the project should contact team leaders or a faculty adviser prior to registering for the course.

ECE 415 Global Position System Theory and Design (also M&AE 415)
Fall. 4 credits. Prerequisites: ECE 301 and ECE 303 or permission of the instructor. P. M. Kintner.
A laboratory course using the Global Positioning System as a model for examining space-based engineering systems. The course consists of lectures, laboratories, and a design project. The laboratory is based on a GPS engine development system and covers the navigation solution, receiver design and function, and differential GPS.

[ECE 423 Computer Methods in Digital Signal Processing
Spring. 4 credits. Prerequisite: ECE 301 or ECE 328; basic knowledge of C/C++ helpful. Satisfies undergraduate computer-applications requirement. Not offered 2001–2002.
Basic computational techniques used in signal processing and communications. Fast algorithms for multidimensional transforms. Solution of structured systems of linear equations. Algorithms for linear least squares estimation problems. Influence of quantization and finite precision arithmetic on the accuracy of numerical methods. Influence of the architecture of modern microprocessors on the design and performance of numerical algorithms.]

ECE 425 Digital Signal Processing
Fall. 4 credits. Prerequisites: ECE 301, ECE 302, and ECE 310. T. W. Parks.
An advanced course in digital signal processing. Topics include sampling, A/D and D/A conversion, digital filter design and implementation, multirate DSP including sampling rate conversion and filter bank theory, Wiener filtering, spectral estimation, introduction to two-dimensional sampling, and Fourier techniques.

ECE 426 Applications of Signal Processing
Spring. 3 or 4 credits. Prerequisite: ECE 425. B. A. Hutchins.
Applications of signal processing, including signal analysis, filtering, and signal synthesis. The course is laboratory oriented, emphasizing individual student projects. Design is done with signal-processing hardware and by computer simulation. Topics include filter design, spectral analysis, speech coding, speech processing, digital recording, adaptive noise cancellation, and digital signal synthesis.

ECE 430 Lasers and Optical Electronics
Fall. 4 credits with lab; may be taken for 3 credits without lab. Prerequisite: ECE 303 or equivalent. C. L. Tang.
An introduction to the operation and application of lasers. Material covered includes diffraction-limited optics, Gaussian beams, optical resonators, interaction of radiation with matter, physics of laser operation, and laser design. Applications of coherent radiation to nonlinear optics, communication, and research are discussed.

ECE 432 MicroElectro Mechanical Systems (MEMS)
Spring. 3 credits. Prerequisite: ECE 315 or permission of instructor. E. C. Kan.
Introductory course to MEMS: microsensors, microactuators, and microrobots. Fundamentals of MEMS including materials, microstructures, devices and simple microelectro-mechanical systems, scaling electronic and mechanical systems to the micrometer/nm-

scale, material issues, and the integration of micromechancial structures and actuators with simple electronics. This is an interdisciplinary course drawing content from mechanics, materials, structures, electronic systems, and the disciplines of physics and chemistry.

ECE 433 Microwave Integrated Circuits
Fall. 4 credits; may be taken for 3 credits without laboratory. Prerequisites: ECE 303 and ECE 306. M. G. Spencer.
An introduction to the design and testing of high-speed circuits (frequencies above 1 GHz). Topics include: computer-aided design, automated microwave measurement techniques, optoelectronic applications, and GaAs monolithic microwave integrated circuits. Six two-week labs cover the basics of designing, fabricating, and testing microwave integrated circuits.

ECE 445 Computer Networks and Telecommunications
Fall. 4 credits. Prerequisites: ECE 314 (or COM S 314) and a course in probability. Z. Haas.
Design, analysis, and implementation of computer and communication networks and systems. This is a basic course in networking. Examples of topics that are covered include data transmission and data encoding, data link control, circuit vs. packet switching, Asynchronous Transfer Mode, local area network technology, network interconnections, protocol design (OSI and IP), network security, and multimedia. Emphasis is placed on performance evaluation.

[ECE 450 Electric Power Systems
Spring. 3 credits. Not offered 2001–2002.
Acquaints students with modern electric power system operation and control. Aspects of the restructuring of the industry and its implications for planning and operation objectives and methods are explored. Topics include unit commitment, economic dispatch, optimal power flow, control of generation, system security and reliability, state-estimation, analysis of system dynamics, and system protection.]

ECE 453 Analog Integrated Circuit Design
Fall. 4 credits. Prerequisites: ECE 301 and ECE 315 or equivalent. ECE 457 recommended as a corequisite. B. A. Minch.
Overview of devices available to analog integrated-circuit designers in modern CMOS and BiCMOS processes: resistors, capacitors, MOS transistors, and bipolar transistors. Basic building blocks for linear analog integrated circuits: single-stage amplifiers, current mirrors, and differential pairs. Transistor-level design of linear analog integrated circuits, such as operational amplifiers and operational transconductance amplifiers. Layout techniques for analog integrated circuits. Throughout the course, emphasis is placed on design-oriented analysis techniques.

ECE 457 Silicon Device Fundamentals
Fall. 4 credits with lab. Prerequisite: ECE 315 and ECE 306 or equivalent. E. C. Kan.
Fundamentals on semiconductor carrier statistics, band diagrams, and transport. The device physics, modeling, simulation, and measurement on pn-junction diodes, Schottky diodes, photodiodes, MOS capacitor, MOSFET, and bipolar transistors (BJT). Emphasis is put on the MOSFET physics for advanced VLSI technology. Six labs cover detailed IV and CV measurements and modeling on devices in the wafer level and in standard packages.

[ECE 462 Artificial Intelligence and Expert Systems for Telecommunication Networks
Spring. 3 credits. Prerequisite: ECE 310 or some familiarity with random variables. Not offered 2001–2002.
In the last two or three years a surprising number of connections between AI and telecommunications have been identified. Significant discoveries in the area of wireless systems (e.g. a variety of network control algorithms) have been found to be straightforward restatements of old results from the field of Artificial Intelligence. (We may hope that the reverse is the case, as well.) It also is becoming clear that, to provide an acceptable level of performance, the next generation of wireless multimedia systems will need some degree of predictive "cognitive" capacity. This senior/introductory graduate course focuses on the expert system side of AI. It has been designed to provide a foundation in the development and analysis of expert systems with an emphasis on telecommunications engineering applications. Students develop a background in the theory of expert systems, and then are given an opportunity to apply their knowledge in an area of their choice. Areas of discussion include: rule-based expert systems, probabilistic systems, Bayesian networks, and the propagation of evidence.]

ECE 467 Telecommunication Systems I
Fall. 4 credits. Prerequisites: ECE 301 and ECE 302. C. R. Johnson.
An introduction to modulation and demodulation techniques. Topics include: signal representation and filtering; amplitude modulation (AM); frequency modulation (FM); pulse amplitude modulation (PAM); pulse-code modulation (PCM); channel noise effects; and synchronization.

ECE 468 Telecommunication Systems II
Spring. 4 credits. Prerequisite: ECE 467 or permission of instructor. Suggested prerequisite: ECE 411. C. R. Johnson, A. Scaglione.
Fundamentals of digital communications. Topics include: digital source coding, Huffman coding, sampling, quantization, analog source coding; optimum receivers for digital transmission through additive white Gaussian noise (AWGN) channels, matched filters; channel capacity and error control coding; digital transmission through bandlimited AWGN channels, inter-symbol interference (ISI), equalization techniques; phase-locked loops (PLL); trellis-coded modulation (TCM); and spread-spectrum communication systems.

ECE 471 Feedback Control Systems (also CHEME 472 and M&AE 478)
Fall. 4 credits. Prerequisites: CHEME 372, ECE 301, M&AE 326, or permission of instructor. R. D'Andrea and A. B. Anton.
For description, see M&AE 478.

ECE 474 Digital VLSI Design
Fall and spring. 5 credits (Fall 4, spring 1). Prerequisites: ECE 231/232, ECE/CS 314. Students will receive an R grade until they test their chips in the spring. R. Manohar.
Introduction to digital VLSI design. Topics include basic transistor physics, switching networks and transistors, combinational and sequential logic, latches, clocking strategies, domino logic, PLAs, memories, physical design, floor planning, CMOS scaling, and performance and power considerations, etc. Lecture and homework topics emphasize disciplined design, and include: CMOS logic, layout, and timing; computer-aided design and analysis tools; and electrical and performance considerations. Students tape out a small project that is tested in the following semester. The course also includes an introduction to asynchronous design.

ECE 475 Computer Architecture
Fall. 4 credits. Prerequisites: ECE 314 or COM S 314. M. Burtscher.
Topics include instruction set principles, advanced pipelining, data and control hazards, multi-cycle instructions, dynamic scheduling, out-of-order execution, speculation branch prediction, instruction-level parallelism, and high-performance memory hierarchies. Students learn the issues and tradeoffs involved in the design of modern microprocessors. Labs involve the design of a processor and cache subsystem at the RTL level.

ECE 476 Digital Systems Design Using Microcontrollers
Spring. 4 credits. Prerequisite: ECE 314 or COM S 314 (ECE 315 strongly recommended).
Design of real-time digital systems using microprocessor-based embedded controllers. Students working in pairs design, debug, and construct several small systems that illustrate and employ the techniques of digital system design acquired in previous courses. The content focuses on the laboratory work. The lectures are used primarily for the introduction of examples, description of specific modules to be designed, and instruction in the hardware and high-level design tools to be employed.

ECE 482 Plasma Processing of Electronic Materials (also MS&E 544)
Spring. 3 credits. Prerequisites: PHYS 213 and 214 or their equivalents. Offered on demand. Staff.
Fundamental principles that govern partially ionized, chemically reactive plasma discharges and their applications to processing electronic materials. Topics include: simple models of low pressure, partially ionized plasmas, collision phenomena, diffusive processes, plasma chemistry, and surface processes. Examples and their applications to electronic materials processing are discussed in detail.

ECE 484 Introduction to Controlled Fusion: Principles and Technology (also M&AE 459, and NS&E 484)
Spring. 3 credits. Prerequisites: PHYS 112, 213, and 214, or equivalent background in electricity and magnetism and mechanics; and permission of instructor. Intended for seniors and graduate students. Offered on demand.
For description, see NS&E 484.

[ECE 486 Electromagnetic Waves and Communication
Spring. 3 credits. Prerequisite: ECE 303. Not offered 2001–2002.
This course is recommended for students who wish to obtain a greater understanding of the fundamentals of guided waves, high data rate electronics and wireless communication. Topics covered will include: vector and scalar potentials, transmission lines, waveguides, fiber optics, antenna arrays, and propagation in different environments including interference and diffraction.]

ECE 487 Introduction to Antennas and Radar
Fall. 3 credits. Prerequisites: ECE 301 and ECE 486 (or a grade of B or better in ECE 303). D. T. Farley.
Fundamentals of antenna theory, including gain and effective area, near and far fields, phased arrays, and aperture antennas and aperture synthesis. Fundamentals of radar, including detection, tracking, Doppler shifts, sampling, and range and frequency aliasing. Synthetic aperture radars and remote sensing from aircraft and satellites; over-the-horizon (OTH) radars and ionospheric propagation effects; and radar astronomy techniques.

ECE 488 RF Circuits and Systems
Spring. 3 credits. Prerequisites: ECE 315 or equivalent. 2 design credits. Lab credit.
Basic RF circuits and applications. Receivers, transmitters, modulators, filters, detectors, transmission lines, oscillators, frequency synthesizers, low-noise amplifiers. Applications include communication systems, radio and television broadcasting, radar, radio, and radar astronomy. Computer-aided circuit analysis. Five laboratory sessions.

ECE 491–492 Senior Electrical and Computer Engineering Project
Fall, 491; spring, 492. 1–8 credits. Limited to seniors in Engineering.
Individual study, analysis, and, usually, experimental tests in connection with a special engineering problem chosen by the student after consultation with the faculty member directing the project. An engineering report on the project is required. Students must make individual arrangements with a faculty sponsor prior to registration for this course and submit a request for an independent project form to the Electrical Engineering undergraduate office.

[ECE 498 Global Position System Projects
Fall, spring. Variable credits. Prerequisite: ECE 415 or permission of instructor. Not offered 2001–2002.
Projects using the Global Positioning System or GPS receivers are offered. Projects vary from semester to semester and typically either explore receiver design, hardware issues, or hardware and system performance. Students are welcome to suggest their own projects.]

ECE 511 Bioelectric Signal Analysis and Processing
Fall. 3 credits. Prerequisites: some knowledge of basic analog circuit design, and a simple, working knowledge of MATLAB. J. C. Belina.
Measurement and computer-aided analysis of low-level biological signals in the presence of background noise. A/D conversion, filtering, signal conditioning, and data compression techniques are investigated. The human surface ECG forms the signal source in much of the course, and so basic electrocardeography is covered. Pattern classification and nonlinear dynamical system analysis are introduced. Four major team design and analysis projects are required in lieu of examinations.

ECE 512 Applied Systems Engineering I (also CEE 504, COM S 504, M&AE 591, OR&IE 512)
Fall. 3 credits. Prerequisite: permission of instructor. A. R. George, R. O. Roundy.
For description, see M&AE 591.

ECE 513 Applied Systems Engineering II (also CEE 505, COM S 505, M&AE 592, OR&IE 513)
Spring. 3 credits. Prerequisite: Applied Systems Engineering I (CEE 504, COM S 504, ECE 512, M&AE 591, or OR&IE 512).
For description, see M&AE 592.

ECE 515–516 Applied Signal Processing Systems Design
515, fall; 516, spring. Variable credits. B. A. Hutchins.
Project-level design of systems in the area of signal processing and general instrumentation, including digital signal processing hardware, audio, speech, and analog interfacing. Students pursue individual projects and coordinate ideas and resources with other students with related interest.

[ECE 521 Theory of Linear Systems
Fall. 4 credits. Prerequisite: ECE 302 or permission of instructor. Recommended: a good background in linear algebra and linear differential equations. Not offered 2001–2002.
State-space and multi-input-multi-output linear systems in discrete and continuous time. The state transition matrix, the matrix exponential, and the Cayley-Hamilton theorem. Controllability, observability, stability, realization theory. At the level of *Linear Systems*, by T. Kailath.]

[ECE 522 Nonlinear Systems: Analysis, Stability, Control, and Applications
Spring. 4 credits. Prerequsites: ECE 521 or a solid background in linear algebra and real analysis strongly recommended but not required. Not offered 2001–2002.
A rigorous introduction to nonlinear systems, including: nonlinear differential equations, flows, phase-plane analysis, fundamentals of Lyapunov theory, LaSalle's Theorem, regions of attraction, slowly varying systems, advanced stability theory, Lyapunov redesign, applied nonlinear control, describing functions, averaging and singular perturbations, and bifurcation analysis and control and application to physical systems.]

[ECE 525 Adaptive Filtering in Communication Systems
Spring. 4 credits. Required prerequisite: ECE 328; recommended prerequisite: ECE 468. Not offered 2001–2002.
Fundamentals of theory for adaptive filters intended for digital communication systems applications. Wired and wireless communication systems tasks (such as channel equalization, echo cancellation, smart antennas, and interference rejection) are used to motivate adaptive filter design issues of current interest. Assignments consist of reports on adaptive digital filter algorithms and their simulated evaluation.]

[ECE 526 Signal Representation and Modelling
Spring. 4 credits. Prerequisites: ECE 425. Not offered 2001–2002.
Sampling and signal reconstruction. Approximation theory. Linear inversion theory. Exponential signal modelling. Multirate filter banks, wavelets, and lifting. Laboratory experiments with speech and image signals.]

[ECE 530 Fiber and Integrated Optics
Spring. 4 credits with lab. Prerequisite: ECE 303 or equivalent. Not offered 2001–2002.
Physical principles of optical waveguides, optical sources and detectors, noise, modulators, and sensing. Wave equation solutions to the mode structure in waveguides, mode coupling, dispersion and bandwidth limitations, optical sources based on semiconductors, detectors and noise, modulation techniques, nonlinear effects in optical waveguides, and optical sensors.]

[ECE 531 Quantum Electronics I
Fall. 4 credits. Prerequisites: ECE 306 and 407, or PHYS 443. Not offered 2001–2002.
A detailed treatment of the physical principles underlying lasers, related fields, and applications. Topics include the interaction of radiation and matter, including emission, absorption, scattering, and basic spectroscopic properties of key laser media; theory of the laser, including methods of achieving population inversions, dispersive effects, and laser oscillation spectrum.]

[ECE 533 Semiconductor Lasers
Spring. 3 credits. Prerequisites: ECE 430, ECE 457, or permission of instructor. Not offered 2001–2002.
Study of principles and characteristics of semiconductor lasers. Topics cover laser dynamics, noise, quantum confined structures, single-frequency lasers, traveling-wave lasers, surface-emitting lasers, reliability, and emerging research subjects. A term project and paper are required.]

ECE 535 Semiconductor Physics
Fall. 4 credits. Prerequisites: ECE 457 and 407, or permission of instructor. S. Tiwari.
Physics of materials and structures useful in semiconductor electronic and photonic devices, including: crystal structure, energy bands, effective mass, phonons, classical low-field transport, high-field and ballistic charge carrier transport, electron scattering by phonons, optical absorption, reflection, optical emissions, deep levels as charge carrier traps, and surface and interface effects. On the level of *Compound Semiconductor Device Physics* by S. Tiwari.

ECE 536 Micro/Nanofabrication Technology
Spring. 4 credits. 3 credits without lab with permission. Prerequisites: ECE 453, or ECE 457 or ECE 439 or equivalent, or permission of instructor.
Fabrication of ultra-large scale integrated circuits (ULSI), microelectromechanics (MEMS), active matrix liquid crystal displays (AMLCD), and optoelectronic integrated circuits (OEIC). Topics include: lithography, diffusion, ion implantation, thin film deposition, etching, metallization, and precision assembly. Process integration for CMOS, BiCMOS, ECL, MEMS, AMLCD's, and OEIC's. Hands-on microfabrication laboratory with full MOS/MEMS process.

ECE 537 Electronic System Packaging
Fall. 4 credits. 3 credits without project with permission of instructor. Prerequisites: ENGRD 231 and ECE 315 or ECE 453 or ECE 457 or ECE 439 or equivalent or permission of instructor. J. P. Krusius.
Physical integration of circuits, chips, packages, modules, boards, and cabinets into electronic systems. Computer, communication, and wireless systems. Portable, desktop, and cabinet level computers. Handset, base station, and switch level communication systems. Physical architecture; electrical and optical signal distribution; power and ground distribution; signal integrity, electromagnetic interference (EMI), and electromagnetic compatibility (EMC); low power and mixed

signal circuit/system design; energy management and cooling; assembly and manufacturing; measurements; computer and wireless system case studies.

[ECE 542 Parallel Processing
Spring. 3 credits. Not offered 2001–2002.
Parallel computer systems that are designed to provide a high computation rate for large specific problems are studied. Topics include computer architecture, interconnection networks, performance characterization, basic algorithms, and parallel programming techniques. Recent multicomputers and massively parallel processors are also discussed.]

ECE 546 Introduction to Color Imaging Science
Spring. 4 credits. Prerequisite: ECE 302.
An introduction to the acquisition, processing, and display of digital color images. This course covers: fundamentals of image formation, color matching functions, color spaces, calibration of scanners, printers, and digital cameras.

ECE 547 Computer Vision
Fall. 4 credits. Prerequisites: ECE 302 (or COM S 280 and 314) or consent of instructor. A. P. Reeves.
Computer acquisition and analysis of image data with emphasis on techniques for robot vision. This course concentrates on descriptions of objects at three levels of abstraction: segmented images (images organized into subimages that are likely to correspond to interesting objects), geometric structures (quantitative models of image and world structures), and relational structures (complex symbolic descriptions of images and world structures). The programming of several computer-vision algorithms is required.

[ECE 548 Digital Image Processing
Spring. 3 credits. Prerequisites: ECE 411, ECE 425, familiarity with linear algebra. Not offered 2001–2002.
Introduction to image processing through seven major topics: perception, statistical modeling, transforms, enhancement, analysis, compression, and restoration. Special attention is allocated to compression. Equal emphasis is placed on gaining a mathematical and an intuitive understanding of algorithms through actual image manipulation and viewing.]

[ECE 549 Visual Motion Seminar
Spring. 1 credit. Not offered 2001–2002.
This seminar provides an overview of motion as used in both coding and analysis of digital video, through examination of motion estimation and motion segmentation techniques. Topics include an introduction to digital video, techniques for computing motion, both block-based and pixel-based motion estimation, MPEG motion coding, Hausdorff-based motion estimation, motion-based tracking, and various techniques for motion segmentation. Emphasis is placed on recent research results.]

ECE 551 Electric Systems Engineering and Economics (Electricity Markets) (also AEM (ARME) 655)
Fall. 2 credits. Prerequisites: basic calculus, microeconomics. R. J. Thomas.
This course is designed to explore new arrangements in power system planning and operation brought about by the current restructuring of the electric industry. The course is organized around lectures on 1) how basic economic principles interact with basic engineering principles used to determine the physical and operational makeup of the system; and 2) the principles and techniques of optimization and their applications to emerging institutional arrangements in the power industry. The course involves extensive laboratory work designed to test the principles under discussion. A final project is assigned, requiring building an intelligent software agent capable of performing in a competitive market with rules similar to those being set up in the electric power business today. The agents are exercised in a class competition.

ECE 554 Advanced Analog VLSI Circuit Design
Spring. 4 credits. Prerequisite: ECE 453.
Advanced analog integrated circuit and system design. Topics include integrated continuous-time filter design, translinear circuits and systems, dynamic analog techniques, integrated discrete-time filter design, and Nyquist-rate data converter design.

ECE 558 Compound Semiconductor Electronics
Spring. 4 credits with lab. Prerequisite: ECE 457 or equivalent.
Electronic properties of advanced semiconductor structures using compound semiconductor materials and heterojunctions. Fundamentals of carrier transport and scattering. Properties of direct bandgap semiconductors and quantum wells. Advanced semiconductor devices including metal-semiconductor transistors (FETs), modulation-doped FETs, and heterojunction bipolar transistors (HBTs). High-frequency operation of compound semiconductor devices. Includes six two-week labs, which include low-temperature carrier transport, optical absorption and emission, and electrical characterization of compound semiconductor devices.

[ECE 561 Error-Control Codes
Spring. 4 credits. Prerequisite: ECE 301 or ECE 521 or equivalent. A strong familiarity with linear algebra is assumed. Not offered 2001–2002.
An introduction to the theory of algebraic error-control codes. Topics include: Hamming codes, group codes, the standard array, minimum-distance decoding, cyclic codes, and the dual of a linear block code. Hamming and Singleton bounds for error-correcting codes. The construction and decoding of Bose-(Ray) Chaudhuri-Hocquenghem (BCH) and Reed-Solomon (RS) codes. Computer methods for the study of the structure and algorithms for error-control are used.]

ECE 562 Fundamental Information Theory
Fall. 4 credits. Prerequisite: ECE 310 or equivalent. T. Berger.
Fundamental results of information theory with application to storage, compression, and transmission of data. Entropy and other information measures. Block and variable-length codes. Channel capacity and rate-distortion functions. Coding theorems and converses for classical and multiterminal configurations. Gaussian sources and channels.

ECE 563 Communication Networks
Spring. 4 credits. Prerequisite: ECE 411 or permission of instructor.
Classical line-switched communication networks: point-process models for offered traffic; blocking and queuing analyses. Stability, throughput, and delay of distributed algorithms for packet-switched transmission of data over local-area and wide-area nets. Flow control and capacity assignment algorithms, ATM networks.

[ECE 565 Statistical Signal Processing
Fall. 4 credits. Prerequisite: ECE 411. Not offered 2001–2002.
This course introduces basic theory and techniques in parameter estimation and statistical signal processing. For estimating deterministic parameters, students consider minimum variance unbiased estimation, Cramer-Rao lower bound, linear models, best linear unbiased estimators, maximum likelihood (ML) estimation, least squares methods, recursive estimation, and methods of moments. For estimating random parameters, the course covers minimum mean square error (MMSE) estimation, and maximum a posteriori (MAP) estimation, Wold decomposition and spectral factorization, and Wiener and Kalman filters. Finally, as applications of basic estimation theory, channel and signal estimation techniques for digital communications are examined. Applications in array signal processing and frequency estimation are discussed throughout the course.]

ECE 566 Wireless Networks
Spring. 4 credits. Prerequisites: ECE 445 and ECE 411.
An introductory course in mobile and wireless networks. The course is targeted mainly at the graduate level, but is open to undergraduates as well. The course covers fundamental techniques and protocols in the design and operation of the first, second, and third generation of wireless networks. Examples of related topics include cellular systems, medium access control, control of a mobile session and a mobile call, signaling in mobile networks, mobility management techniques, common air interfaces (AMPS, IS-136, IS-95, GSM), wireless data (CDPD, Mobitex), satellite communication, ad hoc networks (Bluetooth), Internet Mobility, Personal Communication Services (PCS), and so on.

[ECE 567 Topics in Digital Communications
Spring. 2 credits. Prerequisites: ECE 562. Not offered 2001–2002.
Fundamental topics in modern digital communication. Analytical and computational tools required to understand modern data conversion, transmission, and storage systems. Possible topics include: PCM, DPCM, PAM, PSK, FSK, matched filtering, equalization, line codes, trellis codes, Viterbi decoding, applications to audio, video, and magnetic recording. Vector quantization and universal data compression including LZ, LZW, and arithmetic coding, applied to files, speech, images, and video.]

[ECE 568 Mobile Communication Systems
Spring. 4 credits. Prerequisites: ECE 411 and ECE 467; corequisite: ECE 468. Not offered 2001–2002.
Theory and analysis of mobile communication systems, with an emphasis on understanding the unique characteristics of these systems. Topics include: cellular planning, mobile radio propagation and path loss, characterization of multipath and fading channels, modulation and equalization techniques for mobile radio systems, source coding techniques, multiple access alternatives, CDMA system design, and capacity calculations.]

ECE 572 Parallel Computer Architecture
Fall. 3 credits. Prerequisite/corequisite: ECE 475. M. A. Heinrich.
Principles and tradeoffs in the design of parallel architectures. Emphasis is on latency, bandwidth, and synchronization in parallel machines. Case studies illustrate the history and techniques of shared-memory, message-passing, dataflow, and data-parallel machines. Additional topics include memory consistency models, cache coherence protocols, and interconnection network topologies. Architectural studies presented through lecture and some research papers.

ECE 574 Advanced Digital VLSI Design
Spring. 4 credits. Prerequisites: ECE 474, ECE 475. R. Manohar.
Top-down approach to asynchronous design and the relation between computer architecture and VLSI design. For the asynchronous design component: high-level synthesis, design by program transformations, and correctness by construction. Topics include delay-insensitive design techniques, description of circuits as concurrent programs, circuit compilation, and electrical optimizations. Students complete a group project of the design of a pipelined microprocessor. The processor can be clocked, asynchronous, or a combination of the two. Note: the only difference between taking and not taking ECE 576 is fabricating and testing the chip. All students have to design one.

ECE 575 High-Performance Processor Architecture
Spring. 3 credits. Prerequisite: ECE 475. M. Burtscher.
This course provides in-depth coverage of the advanced architectural features of current and next-generation high-performance microprocessors. Topics include superscalar design, out-of-order execution, register renaming, caching, value prediction, confidence estimation, branch prediction, predication, control speculation, multithreading, compiler optimizations, and case studies of existing processors. Projects involve writing simulators to evaluate the performance of various microprocessor components.

ECE 576 Advanced Digital VLSI Design Project
Fall, spring (2-semester course). 5 credits (fall 4, spring 1). Prerequisites: ECE 474, ECE 475.Groups receive an R in ECE 576 until they fabricate and test their chips the following fall. Offered spring 2002 and fall 2002. R. Manohar.
For description, see ECE 574.

ECE 577 Feedforward Neural Networks
Fall. 4 credits. Prerequisite: ECE 310. T. L. Fine.
Feedforward neural networks (multi-layer perceptrons) are computing systems formed out of many highly interconnected nonlinear memoryless elements that are arranged in a parallel architecture that is loosely modeled on that of the brain. Focus is on their roles as pattern classifiers, signal processors, estimators, and forecasters and on their role in communication systems. Includes exploration of neural networks through mathematical analyses and extensive simulation studies using MATLAB.

ECE 578 Radio Frequency (RF) Integrated Circuit Design
Fall and spring. 6 credits. Prerequisites: ECE 433, ECE 453, and ECE 488. K. T. Kornegay.
This two semester, 6 credit, course conveys practical knowledge of advanced concepts related to the design radio-frequency (RF) integrated circuits in state-of-the-art silicon germanium (SiGe) technology. Emphasis is on the circuit architecture, design, trade-offs, optimization, and layout of RF integrated circuits for use in wireless applications. Special attention is devoted to the most important challenges facing RF circuit designers today, such as the impact of noise, power distribution, and consumption. Low noise amplifier, voltage controlled oscillator (VCO), phase-lock loop, and high performance mixer design are emphasized. The basic transmitter/receiver building blocks are covered and students learn how to design and assemble them to form single chip wireless systems.

ECE 581 Introduction to Plasma Physics (also A&EP 606)
Fall. 4 credits. Prerequisite: ECE 303 or equivalent. First-year graduate-level course; open to exceptional seniors. D. A. Hammer.
Topics covered include: plasma state; motion of charged particles in fields; drift-orbit theory; coulomb scattering, collisions; ambipolar diffusion; elementary transport theory; two-fluid and hydromagnetic equations; plasma oscillations and waves, CMA diagram; hydromagnetic stability; and elementary applications to space physics, plasma technology, and controlled fusion.

ECE 587 Energy Seminar (also NS&E 545 and M&AE 545)
Fall, spring. 1 credit. May be taken for credit both semesters. K. Unlu.
For descripiton, see NS&E 545.

[ECE 594 Nonlinear Computation and Applications in Circuits, Signals, and Systems
Spring. 3 credits. Prerequisites: MATH 293 and MATH 294. Not offered 2001–2002.
This project-oriented course familiarizes students with the many applications of nonlinear analysis in today's engineering design world. The course stresses concepts in relation to contemporary design problems. Applications to information technologies, neural networks, digital communication systems that use chaos techniques, stability of nonlinear systems, and human ECG arrhythmia analysis and prediction demonstrate the range of engineering analysis and design situations to which these techniques apply.]

[ECE 602 Graduate Seminar in Telecommunications and Information Processing
Spring. 2 credits. Can count as one M.Eng. course for Electrical and Computer Engineering. Not offered 2001–2002.
This seminar discusses material at the level of current engineering publications. Faculty sponsors prepare a listing of appropriate subject areas and suggest certain papers for discussion. Students are required to lead discussions on one or two topics as required and are graded on individual presentations, discussion participation, as well as written reports and talk summaries. Topics vary each term.]

[ECE 604 Graduate Seminar in RF, Antenna, and Space Science Systems
Spring. 2 credits. Can count as one M.Eng. course for Electrical and Computer Engineering. Not offered 2001–2002.
This seminar discusses material at the level of current engineering publications. Faculty sponsors prepare a listing of appropriate subject areas and suggest certain papers for discussion. Students are required to lead discussions on one or two topics as required and are graded on individual presentations, discussion participation, as well as written reports and talk summaries. Topics vary each term.]

[ECE 606 Graduate Seminar in Semiconductor and Microelectromechanical Systems
Spring. 2 credits. Can count as one M.Eng. course for Electrical and Computer Engineering. Not offered 2001–2002.
This seminar discusses material at the level of current engineering publications. Faculty sponsors prepare a listing of appropriate subject areas and suggest certain papers for discussion. Students are required to lead discussions on one or two topics as required and are graded on individual presentations, discussion participation, as well as written reports and talk summaries. Topics vary each term.]

[ECE 608 Graduate Seminar in Computer and Digital Systems
Spring. 2 credits. Can count as one M.Eng. course for Electrical and Computer Engineering. Not offered 2001–2002.
This seminar discusses material at the level of current engineering publications. Faculty sponsors prepare a listing of appropriate subject areas and suggest certain papers for discussion. Students are required to lead discussions on one or two topics as required and are graded on individual presentations, discussion participation, as well as written reports and talk summaries. Topics vary each term.]

[ECE 610 Graduate Seminar in Medical Electronics and Analysis Systems
Spring. 2 credits. Can count as one M.Eng. course for Electrical and Computer Engineering. Not offered 2001–2002.
This seminar discusses material at the level of current engineering publications. Faculty sponsors prepare a listing of appropriate subject areas and suggest certain papers for discussion. Students are required to lead discussions on one or two topics as required and are graded on individual presentations, discussion participation, as well as written reports and talk summaries. Topics vary each term.]

ECE 658 Advanced Device Physics and Device Integration
Fall, spring. 4 credits. Prerequisites: ECE 457 and 535, or permission of instructor.
An integrated study of properties of micro- and nano-scale silicon-based electronic devices with emphasis on implementation in circuits. Topics include fundamental properties, scaling and limits, effect of design on digital and analog operation, effect of variations, nano-scale quantum and size effects, and unification of the needs of circuits (integration, low power, high speed, etc.) with device behavior. Devices include field-effect and bipolar transistors, memories, and nanostructures in silicon, silicon-germanium, and silicon-on-insulator.

ECE 672 Distributed Systems
Spring. 3 credits. Prerequisite: ECE 475. W. E. Speight.
Design of distributed systems, with particular emphasis on the field of cluster-based architectures. Students read papers, discuss topics in class, make presentations to the class, and complete a major software design project. Topics include runtime system design, coherence protocols for software distributed shared memory systems, fault tolerant systems, file access, emerging interconnection networks, process and thread migration, adaptive systems, and cluster-based solutions for web servers and multimedia applications.

ECE 691–692 Electrical and Computer Engineering Colloquium
Fall, 691; spring, 692. 1 credit each term. For students enrolled in the graduate field of Electrical and Computer Engineering. J. C. Belina.
Lectures by staff, graduate students, and visiting authorities. A weekly meeting for the presentation and discussion of important current topics in the field. Reports required.

ECE 693–694 Master of Engineering Design
Fall, 693; spring, 694. 1–8 credits. For students enrolled in the M.Eng. (Electrical) degree program. Uses real engineering situations to present fundamentals of engineering design. Each professor is assigned a section number. To register, see roster for appropriate six-digit course ID numbers.

ECE 695 Topics in Integrated Systems
Fall. 1 credit. S-U grades only. E. C. Kan.
This topic series investigates recent trends in integrated systems, spanning from digital, analog, MEMS, RF, optical and mixed-signal design based on present and novel Si technology. Active participation from students is expected in the form of presentations, discussions and reports.

ECE 791–792 Thesis Research
Fall, 791; spring, 792. 1–15 credits. For students enrolled in the master's or doctoral program.

MATERIALS SCIENCE AND ENGINEERING

Undergraduate Courses

MS&E 111 Nanotechnology (also ENGRI 111)
Fall. 3 credits. E. Giannelis.
This is a course in the Introduction to Engineering series. For description, see ENGRI 111.

MS&E 118 Design Integration: A Portable CD Player (also ENGRI 118 and T&AM 118)
Spring. 3 credits. W. Sachse.
This is a course in the Introduction to Engineering series. For description, see ENGRI 118.

MS&E 119 Biomaterials for the Skeletal Systems (also ENGRI 119)
Fall. 3 credits. D. T. Grubb.
This is a course in the Introduction to Engineering series. For description, see ENGRI 119.

[MS&E 124 Designing Materials for the Computer
Spring. 3 credits. 3 lectures. Not offered 2001–2002. C. K. Ober.
This is a course in the Introduction to Engineering series. For description, see ENGRI 124.]

MS&E 204 Materials Chemistry
Spring. 3 credits. U. B. Wiesner.
This course is designed to give a molecular understanding of materials properties with emphasis on general concepts. In the first part, the structure of atoms is discussed introducing fundamental concepts of quantum chemistry. In the second part the transition from atoms to molecules is made discussing symmetry aspects of chemical bonding. The last part describes the transition from molecules to materials. Materials classes covered include modern examples of polymers, organic semiconductors, ceramics, organic-inorganic hybrids, and superconductors emphasizing the interdisciplinary nature of materials science. Examples illustrate current materials research involving nano-biotechnology, organic optoelectronics, self-assembling materials, or nano-ceramic.

MS&E 206 Atomic and Molecular Structure of Matter
Spring. 3 credits. S. L. Sass.
Bonding in materials; crystal structures and symmetry; defects. Crystal planes and directions; stereographic projections. Techniques for structural analysis: direct and diffraction methods. X-ray and electron diffraction. Electron microscopy.

MS&E 261 Introduction to Mechanical Properties of Materials (also ENGRD 261)
Fall. 3 credits. S. P. Baker.
For description, see ENGRD 261.

MS&E 262 Introduction to the Electronic Properties of Materials (also ENGRD 262)
Fall. 3 credits. Prerequisite MATH 192; Corequisite PHYS 213 or permission of instructor. G. Malliaras.
For description, see ENGRD 262.

MS&E 265 Biological Materials and Their Synthetic Replacements
Spring. 3 credits. D. Grubb.
From contact lenses and false teeth to arterial implants and hip joints, a tremendous range of synthetic materials are used in contact with the body to replace or supplement natural biological materials. The course considers a number of biological systems and describe the properties and structure of the natural materials. Requirements for candidate replacement materials are discussed, with historical and current solutions. These involve material properties such as strength and corrosion resistance as well as toxicity and bio-compatibility. Design constraints, including methods of production, economics, regulatory approval, and legal liabilities are also considered.

MS&E 281 The Substance of Civilization—Materials through the Ages
Fall. 3 credits. 2 lectures, 1 lab. S. L. Sass.
Materials have enabled revolutionary advances in how we live, work, fight, travel, and play; hence the naming of eras after them—Stone, Bronze, and Iron Ages. This course explores the role of materials in the development of the modern industrial Western civilization by putting technology into a historical context and examining the advances made possible by innovations with materials, starting with the Stone Age. Interconnections between crucial innovations and historical events are identified and explored. Lectures, demonstrations, and hands-on laboratory experiments elucidate the origin of the unique properties of materials such as polymers, ceramics, metals, and glass. This course is designed to fulfill the science requirement in the College of Arts and Sciences.

MS&E 291–292 Research Involvement IIa and IIb
291, fall; 292, spring. 3 credits each term. Prerequisite: approval of department. Staff.
Supervised independent research project in association with faculty members and faculty research groups of the department. Students design experiments, set up the necessary equipment, and evaluate the results. Creativity and synthesis are emphasized. Each semester may be taken as a continuation of a previous project or as a one-term affiliation with a research group.

MS&E 302 Mechanical Properties of Materials, Processing, and Design (also MS&E 582)
Spring. 3 credits. Prerequisite: MS&E 206. Corequisite: MS&E 304, or permission of instructor. A. L. Ruoff.
Stress, strain, and the basics of concepts in deformation and fracture for metals, polymers, and ceramics. Analysis of important mechanical properties such as plastic flow, creep, fatigue, fracture toughness, and rupture. Application of these principles to the design of improved materials and engineering structures.

MS&E 303 Thermodynamics of Condensed Systems (also MS&E 583)
Fall. 4 credits. Prerequisites: PHYS 214 and MATH 294. A. Ruoff.
The three laws of thermodynamics are introduced as the fundamental basis for thermal and chemical equilibrium. Statistical mechanics extensions are developed for calculations of entropy and specific heat capacities. These principles are applied to understanding phase equilibria and phase diagrams, heterogeneous reactions, solutions, electrochemical processes, surfaces, and defects.

MS&E 304 Kinetics, Diffusion, and Phase Transformation (also MS&E 584)
Spring. 4 credits. Prerequisite: MS&E 303 or permission of instructor. R. Dieckmann.
Topics include: electrochemistry (electrode potentials, EMF, Pourbaix diagram); phenomenological and atomistic theories of diffusion; diffusion in metals, alloys, and non-metals; diffusion in the presence of driving forces; fast diffusion paths; thermo and electrotransport; interfaces and microstructure; nucleation and growth; solidification of alloys; and diffusional and diffusionless transformations in solids.

MS&E 305 Electronic Structure of Matter (also MS&E 585)
Fall. 3 credits. Prerequisite: MS&E 206 or permission of instructor. J. M. Blakely.
This course covers quantum theory and electronic structure as it applies to electron conduction. Basic principles of wave mechanics. Electrons in crystals. Electronic structure of metals, semiconductors, and insulators. Conductivity of solids: electronic

and ionic contributions; effects of an electric field on electrons in periodic potentials; sources of electron scattering, atomic vibrations, and defects.

MS&E 306 Electronic, Optical, and Magnetic Properties of Materials (also MS&E 586)
Spring. 3 credits. Prerequisites: MS&E 305 or permission of instructor. Y. Suzuki.
This course covers electrical, optical, and magnetic phenomena that are found in crystalline solid materials. Conduction in metals, semiconductors, and insulators. Design of semiconductor properties by doping. Properties of semiconductor devices (p-n junctions and transistors). Absorption, emission, luminescence. Principles and design of magnetic and superconducting materials for relevant applications. Dielectric properties. Ionic conductivity.

MS&E 307 Materials Design Concept I
Fall. 1 credit. Y. Suzuki.
For description, see MS&E 407.

MS&E 391–392 Research Involvement IIIa and IIIb
391, fall; 392, spring. 3 credits each term. Prerequisite: approval of department. Staff.
For description, see MS&E 291. May be continuation or a 1-term affiliation with a research group.

MS&E 403–404 Senior Materials Laboratory I and II
403, fall; 404 spring. 3 credits each term. D. T. Grubb.
Practical laboratory covering the analysis and characterization of materials and processing. Emphasis is on design of experiments for evaluation of materials' properties and performance as related to processing history and microstructure. Projects available in areas such as plasticity, mechanical and chemical processing, phase transformations, electrical properties, magnetic properties, and electron microscopy.

MS&E 405–406 Senior Thesis I and II
405, fall; 406 spring. 4 credits each term. D. T. Grubb.
Open to advanced undergraduates in lieu of the senior materials laboratory. Proposals for thesis topics should be approved by the supervising faculty member prior to beginning the senior year. Approved thesis topics normally involve original experimental research in direct collaboration with an ongoing research program. Periodic oral and written presentations and a final written thesis are required. Both semesters must be taken to complete the laboratory requirement. This course is required for graduation with honors.

MS&E 407 Materials Design Concepts II
Fall. 2 credits. Y. Suzuki.
Develops design in the field of materials science using Dieter's *Engineering Design*, Ashby's *Materials Selection in Engineering Design*, and other sources. Innovation, patent searching, and ASTM standards. Speakers from industry and other institutions lecture on case studies of design problems. Students give short oral presentations and written reports. Study includes prior art literature, materials selection, and some modeling, as well as discussion of broader economic, regulatory, environmental, and liability concerns that may arise. Students are required to develop a design-study project.

MS&E 491–492 Research Involvement IVa and IVb
491 fall, 492, spring. 3 credits each term. Prerequisite: approval of department. Staff.
For description, see MS&E 291. May be continuation or a one-term affiliation with a research group.

MS&E 495 Undergraduate Teaching Involvement
Fall, spring. Variable credit. Staff.
This course will give credit to students who help in the laboratory portions of ENGRI 111, 119 or 124, ENGRD 261 or MS&E 281. The number of credits earned will be determined by the teaching load and will typically be 1–3 credits.

MS&E 512 Mechanical Properties of Thin Films
Spring. 3 credits. Offered alternate years. S. P. Baker.
Mechanical properties which are unique to materials in the form of thin films (typical thickness 1 micrometer and less) and micrometer scale structures. Mechanics of two-dimensional structures. Stress and mechanical property measurement methods in small dimensions. Microstructural development in thin films. Elastic, plastic, and fracture response of films and constrained volumes.

MS&E 521 Properties of Solid Polymers
Fall. 3 credits. Prerequisite: ENGRD 261. Corequisite: MS&E 303 or permission of instructor. U. B. Wiesner.
Synthetic and natural polymers for engineering applications. Production and characterization of long-chain molecules. Gelation and networks, rubber elasticity, elastomers, and thermosetting resins. Amorphous and crystalline thermoplastics and their structure. Time- and temperature-dependent elastic properties of polymers. Glass transition and secondary relaxations. Plastic deformation and molecular orientation.

MS&E 523 Physics of Soft Materials
Fall. 3 credits. Offered alternate years. U. B. Wiesner.
The course covers general aspects of structure, order and dynamics of soft materials. Typical representatives of this class of materials are polymers, liquid crystals, gels and surfactant solutions. A general formalism for the description of order in terms of orientation distribution functions is introduced. Examples are given for the measurement of order parameters for partially ordered materials. Finally, the dynamics of soft materials is discussed. Besides transport and flow behavior aspects of the local dynamics of soft materials are presented. Emphasis is put on the discussion of various techniques frequently used (and available at Cornell) for the characterization of structure, order and dynamics of soft materials such as NMR or various scattering techniques. Using examples of modern multidimensional spectroscopic methods the issue of heterogeneous dynamics at the glass transition of amorphous liquids is presented at the end of the class.

MS&E 524 Materials Chemistry of Synthetic Polymeric Materials
Fall. 3 credits. Prerequisite: MS&E 521 or permission of instructor. Offered alternate years. C. K. Ober.
Preparation of synthetic polymers by step- and chain-growth polymerization: condensation; free radical, anionic, and cationic mechanisms; ring opening and coordination routes. Statistical and kinetic aspects of homopolymer and copolymer formation. Stereochemistry of polymers and spectroscopic methods for polymer analysis. Molecular aspects of polymer design for properties such as conductivity, elasticity, thermal stability, and engineering properties. Special topics include liquid crystalline polymers, photoresists, and supermolecular chemistry. At the level of *Principles of Polymerization*, by Odian.

MS&E 525 Organic Optoelectronics
Fall. 3 credits. Offered alternate years. G. G. Malliaras.
Overview of relevant materials from small aromatic molecules to conjugated polymers. Focuses on optoelectronic properties including photophysics (absorption, emission, photogeneration, recombination), charge transport (doping, hopping, disorder, charge injection), and elements of nonlinear optics. Optoelectronics applications (such as electrophotography, light emitting diodes, lasers, photovoltaic cells, thin film transistors) are also discussed.

MS&E 531 Introduction to Ceramics
Fall. 3 credits. R. Dieckman.
This course covers: ceramic processes and products, crystal structures, structure of glasses, point defects (point-defect chemistry and relation to non-stoichiometry), line defects, grain boundaries, diffusion in ionic materials (emphasis on the relationships between diffusion and point-defect structure), phase diagrams, phase transformations, kinetics of solid-state reactions (reactions with and between solids: heterogeneous reactions, reactions between different solids, point-defect relaxation, internal reactions), grain growth, and sintering. Physico-chemical aspects are emphasized.

MS&E 532 Glass, Ceramic, and Glass-Ceramic Materials: Critical Components in Technologies
Spring. 3 credits. Offered alternate years. Staff.
Conventional and unconventional techniques for processing glass, glass-ceramic, and ceramic materials. Case studies illustrate the design, engineering, and scientific aspects of such processes. Vapor processes for high-purity optical fibers, hot-processing of ceramic turbine blades, photosensitive materials, and powder processing and sintering of ceramics are discussed. Course taught with industrial participation.

MS&E 541 Microprocessing of Materials
Spring. 3, 4, or 5 credits. P. Krusius and D. Ast.
The previous material science course in microprocessing has been combined with EE356 and is taught jointly with EE. The course consists of a 2 lecture, 3 credit core course providing an introduction to the materials and processes used to fabricate integrated circuits and micro electromechanical systems. An optional extension is a hands-on, 1 credit, laboratory in which students fabricate transistors, simple integrated circuits, and MEMS structures. Students enrolled in MS&E 541 must enroll in the advanced topic, 1 credit, section of the course. Enrollment in the advance credit section is optional for students registered in EE 536. The recommended textbook is "The Science and Engineering of Microelectronic Fabrication" By Campbell. Course notes available to registered students on a password protected web site.

MS&E 542 Materials Design in Electronic Packaging
Spring. 3 credits. Staff.
Design, materials, and manufacturing needs for packaging technology from chip to board. Principles involved in key areas of materials science and other engineering disciplines. Packaging materials to be discussed include metals, ceramics, and polymers.

MS&E 543 Thin-Film Material Science
Fall. 3 credits. Offered alternate years. D. G. Ast.
This course provides fundamental information on the deposition, properties, reaction and evaluation of thin films. Topics covered include: deposition techniques, surface energies, stress in thin films, surface kinetics, homoepitaxy, heteroepitaxy and superlattices, electrical and optical properties, Schottky barriers, solid phase regrowth, interdiffusion, thin film reactions, and electromigration. The recommended textbook is "Electronic Thin Film Science for Electrical Engineers and Material Scientists" by Tu, Mayer, and Feldman.

MS&E 544 Plasma Processing of Electronic Materials (also ECE 482)
Spring. 3 credits. Prerequisites: PHYS 213 and 214 or their equivalents. Offered on demand. Staff.
For description, see ECE 482.

MS&E 545 Magnetic Materials
Fall. 3 credits. Prerequisites: PHYS 213 and 214, or equivalent. Offered alternate years. Y. Suzuki.
This course covers the fundamentals of magnetic phenomena and specific magnetic materials and their use in modern applications. Magnetization phenomena, the origin of magnetism in a material, magnetic domains, and magnetic anisotropy are included in the fundamentals. Specific magnetic materials and their applications include: ferromagnetism in thin films and fine particles, amorphous magnetic materials; magnetic recording, magnetic circuits.

MS&E 546 Solar Cells: Energy from the Environment
Fall. 2 or 3 credits. Lec, 2 credits. Lab, 1 credit. Laboratory enrollment is limited to 10 students. No prerequisites. D. G. Ast.
Solar cells provide power to satellites but are increasingly used for other applications, including the generation of electricity to power homes, and even cars and airplanes. This course introduces the physics, design, manufacturing, testing, applications, and long term reliability of solar cells. Topics include the energy distribution of the solar spectrum in space and at the surface of the earth, the physics of converting of light into electricity, the ideal conversion efficiency of solar cells, solar cell design, the economical fabrication of solar cells, testing and government regulations, and the long term reliability of solar cells. The course covers mostly classical solid state solar cells but provides an introduction to emerging competing technologies using polymers and organic dyes. In the laboratory, students fabricate and test a solar cell. The instructor provides special recitations, as needed, for students lacking a semiconductor background but interested in the subject of solar cells. The recommended textbook is "Solar Cells, Operating Principles, Technology and Systems Applications" by Martin Green.

MS&E 555 Introduction to Composite Materials (also CEE 475, M&AE 455, and T&AM 455)
Spring. 4 credits.
For description, see T&AM 455.

MS&E 563 Nanobiotechnology (also A&EP 663 and BIO G 663)
Spring. 3 credits.
For description, see A&EP 663.

MS&E 571 Physics of Modern Materials Analysis
Spring. 3 credits. D. T. Grubb.
Survey of modern analytical techniques used to determine composition and structure of near-surface and bulk materials. Interaction of ions, electrons, and photons with solids; characteristics of the emergent radiation. Techniques covered include ion scattering, Auger electron spectroscopy, nuclear activation, secondary ion mass spectroscopy, UV and X-ray photoelectron spectroscopies, and X-ray techniques. Selection and design of experiments.

MS&E 575 Introduction to Point and Space Groups (also ECE 495)
Fall. 2 credits. S-U grades only. R. L. Liboff.
For description, see ECE 495.

Graduate Professional Courses

MS&E 501–502 Special Project
501, fall; 502, spring. 6 credits each term.
Master of Engineering research project.

MS&E 582 Mechanical Properties of Materials, Processing, and Design (also MS&E 302)
Spring. 3 credits. Corequisite: MS&E 584, or permission of instructor. A. L. Ruoff.
For description, see MS&E 302.

MS&E 583 Thermodynamics of Condensed Systems (also MS&E 303)
Fall. 4 credits. M. O. Thompson.
For description, see MS&E 303.

MS&E 584 Kinetics, Diffusion, and Phase Transformation (also MS&E 304)
Spring. 4 credits. Prerequisite: MS&E 583 or permission of instructor. R. Dieckmann.
For description, see MS&E 304.

MS&E 585 Electronic Structure of Matter (also MS&E 305)
Fall. 3 credits. J. M. Blakely.
For description, see MS&E 305.

MS&E 586 Electronic, Optical, and Magnetic Properties of Materials (also MS&E 306)
Spring. 3 credits. Prerequisite: MS&E 585 or permission of instructor. Y. Suzuki.
For description, see MS&E 306.

Graduate Core Courses

MS&E 601 Thermodynamics of Materials
Fall. 3 credits. Prerequisite: course in thermodynamics at level of MS&E 303. M. O. Thompson.
Topics covered include: basic statistical thermodynamics, partition functions and thermodynamic state functions, distributions, laws of thermodynamics, free-energy functions and conditions of equilibrium, chemical reactions, statistics of electrons in crystals, heat capacity, heterogeneous systems and phase transitions, and lattice models of 1-, 2-, and 3-dimensional interacting systems. Also covers: statistical thermodynamics of alloys, free-energy and phase diagrams, order-disorder phenomena, point defects in crystals, and statistical thermodynamics of interfaces.

MS&E 602 Elasticity, Plasticity, and Fracture
Spring. 3 credits. Offered alternate years. S. P. Baker.
An advanced overview of mechanical properties of materials combining concepts from continuum mechanics, atomic structure, thermodynamics, and kinetics. Topics include: elastic properties of crystals, glasses, and polymers; mechanical damping; plastic deformation in metals and polymers; creep deformation; fracture in brittle and ductile materials; the effects of temperature, time, and thermomechanical history on properties; metals, ceramics, polymers, and composites; and models and scaling laws for mechanical behavior.

MS&E 603 Analytical Techniques for Materials Science (also MS&E 571)
Spring. 3 credits. D. T. Grubb.
For description, see MS&E 571.

MS&E 604 Kinetics of Reactions in Condensed Matter
Fall. 3 credits. A. L. Ruoff.
Phenomenology and microscopic aspects of diffusion in fluids, both simple and polymeric, and in metallic and ionic solids. Covers: phase stability and transformations; nucleation and growth, spinodal decomposition and displacive transformations; phase coarsening processes, recrystallization, and grain growth; diffusion-controlled growth, interfacial reactions, moving boundary problems; and grain-boundary migration controlled kinetics. At the level of *Diffusion in the Condensed State*, by Kirkaldy and Young.

Related Course in Another Department

Introductory Solid-State Physics (PHYS 454)

Further Graduate Courses

MS&E 621 Advanced Inorganic Chemistry III: Solid-State Chemistry (also CHEM 607)
Spring. 4 credits. Prerequisite: CHEM 605 or permission of instructor. F. DiSalvo.
For description, see CHEM 607.

MS&E 622 Synthetic Polymer Chemistry (also CHEME 675 and CHEM 671)
Spring. 4 credits. Prerequisites: CHEM 359–360 or equivalent or permission of instructor. Staff.
For description, see CHEM 671.

MS&E 631 Solid-State Reactions
Fall. 3 credits. Offered alternate years. R. Dieckmann.
Topics include: point defects (thermal disorder, component-activity-dependent disorder, influence of dopants, different kinds of associates, Coulomb interaction between point defects), dislocations, grain boundaries; transport in solids (definition and different types of diffusion coefficients, reference frames, mechanisms of electrical conduction, elementary diffusion mechanisms, atomic theory of transport, correlation effects, phenomenological theory of transport including some aspects of thermodynamics of irreversible processes, Fick's laws); point-defect relaxation (migration controlled, phase-boundary-reaction controlled); inter-diffusion; solid-state reactions involving compound formation (oxidation of metals, reactions between solids); and de-mixing of materials in

potential gradients, and selected solid-state processes (internal reactions, etc.).

[MS&E 632 Solid State Electrochemistry
Fall. 3 credits. Prerequisite: MS&E 631 or permission of instructor. Not offered 2001–2002. R. Dieckmann.
Topics include: disorder in solids; thermodynamic quantities or quasi-free electrons and electron defects in semiconductors; mobility, diffusion, and partial conductivity of ions and electrons; solid ionic conductors, solid electrolytes, and solid solution electrodes; galvanic cells with solid electrolytes for thermodynamic investigations; and technical applications of solid electrolytes. At the level of *Electrochemistry of Solids* by H. Rickert.]

MS&E 655 Composite Materials (also M&AE 655 and T&AM 655)
Spring. 4 credits. Staff.
For description, see T&AM 655.

MS&E 671 Principles of Diffraction (also A&EP 711)
Spring. 3 credits. Letter grades only. J. D. Brock.
For description, see A&EP 711.

MS&E 672 Transmission Electron Microscopy
Spring. 3 credits. Prerequisite: MS&E 206 or equivalent. Offered alternate years. S. L. Sass.
This course covers the theory and practice of obtaining and interpreting TEM data from crystalline materials. Topics include microscope optics and conventional and high resolution image formation. Special emphasis is placed on electron diffraction (formation and analysis of spot patterns, Kikuchi patterns, and convergent beam patterns), and obtaining useful images of crystal defects. Practical requirements for high-resolution imaging of crystal lattices and interfaces are also covered. Associated theoretical topics include kinematical and dynamical diffraction theories, the contrast transfer function theory of phase contrast, and image modeling and image analysis for quantitative interpretation of data. Current text is *Transmission Electron Microscopy* by D. B. Williams and C. B. Carter.

MS&E 681 Surfaces and Interfaces in Materials
Spring. 3 credits. Offered alternate years. J. M. Blakely.
This course deals with special topics in the field of surface and interface science. Some knowledge of basic statistical thermodynamics, crystallography, elementary quantum mechanics, and theory of rate processes is assumed. The following are the main topics: statistical thermodynamics of interfaces, morphological stability, atomic structure, energetics and structure determination, electronic structure of interfaces, charge and potential distributions, surface steps, adsorption and segregation, atomic transport and growth processes at surfaces, oxidation, and other surface reactions.

Specialty Courses

MS&E 800 Research in Materials Science
Fall, spring. Credit to be arranged. Staff.
Independent research in materials science under the guidance of a member of the staff.

MS&E 801 Materials Science and Engineering Colloquium
Fall and spring. 1 credit each term. Credit limited to graduate students. Staff.
Lectures by visiting scientists, Cornell staff members, and graduate students on subjects of interest in materials sciences, especially in connection with new research.

MS&E 802 Materials Science Research Seminars
Fall, spring. 2 credits each term. For graduate students involved in research projects. Staff.
Short presentations on research in progress by students and staff.

MECHANICAL AND AEROSPACE ENGINEERING

General and Required Courses

M&AE 101 Naval Ship Systems
For description, see NAV S 202.

M&AE 102 Drawing and Engineering Design (also ENGRG 102)
Fall, spring. 1 credit. Half-term course offered twice each semester. Enrollment limited to 30 students each half term. Recommended for students without previous mechanical drawing experience. Letter grades required for students majoring in M&AE; S-U grades optional for all others.
For description, see ENGRG 102.

M&AE 117 Introduction to Mechanical Engineering (also ENGRI 117)
Fall or spring, to be determined. 3 credits. 2 lectures and 1 lab per week.
This is a course in the Introduction to Engineering series. For description, see ENGRI 117.

M&AE 127 Introduction to Entrepreneurship and Enterprise Engineering (also ENGRI 127)
Spring. 3 credits. Open to all Cornell students regardless of major, no prerequisites.
This course is considered an "Introduction to Engineering" course by the College of Engineering, and satisfies the curricular requirement for such a course. For description, see ENGRI 127.

M&AE 212 Mechanical Properties and Processing of Engineering Materials
Spring. 4 credits. Prerequisite: ENGRD 202.
Introduction to the broad range of mechanical behavior of materials and their processing; atomic bonding and crystalline structures, point and line defects, plastic deformation of crystals and polycrystals; hardening behavior and basic elements of plasticity; equilibrium microstructural development and time-dependent phase transformations; bulk deformation processes; the ideal work and slab analysis methods; failure of materials; and materials selection.

M&AE 221 Thermodynamics (also ENGRD 221)
Fall, spring, may be offered summer. 3 credits. Prerequisites: MATH 192 and PHYS 112.
For description, see ENGRD 221.

M&AE 225 Mechanical Synthesis
Spring. 3 credits. Prerequisite: ENGRD 202. Pre- or coreguisites: ENGRD 203 and ENGRD 221. Lab fee.
A hands-on introduction to the mechanical design process. Basic prototyping skills developed using machine tools. Mechanical dissection used to demonstrate successful product design and function. Design projects provide experience from conceptualization through prototype construction and testing.

M&AE 323 Introductory Fluid Mechanics
Fall. Usually offered in Engineering Cooperative Program also. 4 credits. Prerequisites: ENGRD 202 and 203 and coregistration in 221, or permission of instructor.
Topics covered include: physical properties of fluids, hydrostatics, conservation laws using control volume analysis and using differential analysis, Bernoulli's equation, potential flows, simple viscous flows (solved with Navier-Stokes equations), dimensional analysis, pipe flows, boundary layers, introduction to compressible flow.

M&AE 324 Heat Transfer
Spring. May also be offered in Engineering Cooperative Program. 3 credits. Prerequisite: M&AE 323 or permission of instructor.
Topics include: conduction of heat in steady and unsteady situations; surfaces with fins and systems with heat sources; forced and natural convection of heat arising from flow around bodies and through ducts; heat exchangers; emission and absorption of radiation; and radiative transfer between surfaces.

M&AE 325 Mechanical Design and Analysis
Fall. Usually offered in Engineering Cooperative Program also. 4 credits. Prerequisites: ENGRD 202, ENGRD 203, M&AE 212, and M&AE 225. Lab fee.
Application of the principles of mechanics and materials to problems of analysis and design of mechanical components and systems.

M&AE 326 System Dynamics
Spring. May be offered in Engineering Cooperative Program. 4 credits. Prerequisite: MATH 294, ENGRD 203. Junior standing required.
Dynamic behavior of mechanical systems: modeling, analysis techniques, and applications; vibrations of single- and multi-degree-of-freedom systems; feedback control systems. Computer simulation and experimental studies of vibration and control systems.

M&AE 427 Fluids/Heat Transfer Laboratory
Fall. 3 credits. Prerequisites: M&AE 323, 324. Fulfills the technical writing requirement.
Laboratory exercises in methods, techniques, and instrumentation used in fluid mechanics and the thermal sciences. Measurements of temperature, heat transfer, viscosity, drag, fluid-flow rate, effects of turbulence, air foil stall, and spark ignition engine performance. Biweekly written assignments.

M&AE 428 Seminar on Engineering Design
Fall. 2 credits. Prerequisite: completion of 6 semesters in mechanical engineering or equivalent. S-U grades only.
This course is offered to illustrate the design 'process' in action. It consists of seminars by industrial and academic practioners of design. Case studies are presented in weekly invited

lectures from a wide range of disciplines, including thermo-fluid processes, manufacturing, energy, mechanical design, aerospace, and biological sciences. The invited lectures are supplemented by one or more design 'projects' in the semester.

M&AE 591 Applied Systems Engineering I (also CEE 504, COM S 504, ECE 512, OR&IE 512)
Fall. 3 credits. Prerequisite: permission of instructor, and concurrent enrollment in a group-based project that has a strong system design component and is approved by an ASEI instructor.
Fundamental ideas of systems engineering, and their application to design and development of various types of engineered systems. Defining system requirements, creating effective project teams, mathematical tools for system analysis and control, testing and evaluation, economic considerations, and the system life cycle.

M&AE 592 Applied Systems Engineering II (also CEE 505, COM S 505, ECE 513, OR&IE 513
Spring. 3 credits. Prerequisite: Applied Systems Engineering I (CEE 504, COM S 504, ECE 512, M&AE 591, or OR&IE 512).
An advanced course in the application of the systems engineering process to the design and operation of complex systems. It focuses on the descriptive and analytical tools of systems engineering including schematic databases, optimization, discrete event simulation, statistics for design and control, and decision analysis. Case studies are presented in the application of these techniques to space transportation, power, manufacturing, transportation, nuclear power licensing, and military systems.

Mechanical Systems, Design, Materials Processing, and Precision Engineering

M&AE 103 Introduction to Computer Numerical Control (CNC) Programming
Fall, spring. 1 credit, approximately 8 weeks (total 15 hrs. of instruction and 15 hrs. of lab). Prerequisite: M&AE 225, equivalent experience, or permission of instructor.
M&AE 103 introduces students to the fundamentals of computer numerical control (CNC) programming using G codes and SmartCAM® modeling software. Students learn setup, tool selection and operation of CNC mills and lathes. They also receive an introduction to the CNC machine tool as an electro-mechanical system. This course is required for students wishing to use the CNC equipment in the Emerson Lab's Product Realization Facility for team or research projects.

M&AE 386 Automotive Engineering
Spring. 3 credits. Prerequisite: M&AE 325 or permission of instructor.
Selected topics in the analysis and design of vehicle components and vehicle systems. Emphasis on automobiles, trucks, and related vehicles. Power plant, drive line, brakes, aerodynamics, suspension, and structure. Other types of vehicles may be considered.

M&AE 412 Smash and Crash: Mechanics of Large Deformations
Fall. 4 credits. Prerequisites: M&AE 212, T&AM 202. Fulfills field design requirement.
Severe loading is a defining feature of both materials processing and crash worthiness. Materials intentionally are stressed beyond their elastic limits, resulting in deformations that are not reversible. In materials processing, the desire is to change the shape to manufacture components; in crash worthiness, it is to absorb the vehicle's energy. In this course the fundamentals of plasticity are covered: yielding, flow laws, work hardening. Various solution methods, including bound theorems, are presented. The fundamentals are applied to localization, primary and secondary forming operations, and plastic buckling. Laboratory experiments deal with these topics and conclude with the individual design, construction, and testing of a crash cage.

M&AE 415 Global Position System Theory and Design (also ECE 415)
Fall. 4 credits. Prerequisites: ECE 301 and ECE 303 or permission of instructor.
For description, see ECE 415.

M&AE 417 Introduction to Robotics: Dynamics, Control, Design
Spring. 3 credits.
Introductory course in the analysis and control of mechanical manipulators. Topics include: spatial descriptions and transformations, manipulator kinematics and inverse kinematics, differential relationships and static forces, manipulator dynamics, trajectory generation, sensors and actuators, trajectory control, and compliant motion control. Several experiments with a five axis manipulator arm as well as simulation and design using MATLAB and multibody codes are used.

M&AE 425 FSAE Automotive Design Project
Fall, spring. 3 or 4 credits. Intended for M&AE or ECE juniors and seniors, or by arrangement with instructor. Usually 3 credits. Permission of instructor only.
Project course to research, design, build, develop, and compete with a Formula SAE car for intercollegiate competition. Students work in interdisciplinary teams using concurrent engineering and systems engineering principles applied to complex mechanical, electromechanical, and electronic systems.

M&AE 426 FSAE Auto Design Project (Design Option)
Fall, spring. 3 or 4 credits. Limited to M&AE seniors; permission of instructor only.
Senior design version of M&AE 425. For description, see M&AE 425.

M&AE 440 Hybrid Electric Vehicle
Fall, spring. 3 credits for team members; 4 credits for team leaders. Enrollment limited to a maximum of 4 semesters. Permission of instructor only.
Team work on the design and fabrication of a hybrid vehicle for national competition.

M&AE 441 Hybrid Electric Vehicle (Design Option)
Fall, spring. 3 or 4 credits. Limited to M&AE seniors; permission of instructor only.
Senior design version of M&AE 440. For description, see M&AE 440.

M&AE 455 Introduction to Composite Materials (also CEE 475, MS&E 555, and T&AM 455)
Spring. 4 credits.
For description, see T&AM 455.

M&AE 461 Entrepreneurship For Engineers (also ENGRG 461)
Fall. 3 credits. Enrollment open to upper class engineers; others with permission of instructor.
This course develops skills necessary to identify, evaluate, and begin new business ventures. Topics include intellectual property, competition, strategy, business plans, technology forecasting, finance and accounting, and sources of capital. A rigorous, quantitative approach is stressed throughout, and students create financial documents and plans, analyze human resource models, and work with sophisticated valuation methods, complicated equity structures, and legal and business documents. As such, this course represents the "red meat" of entrepreneurship, and the soft skills are left for other courses. Coursework consists of discussions, assignments, and the preparation and presentation of a complete business plan.

M&AE 463 Neuromuscular Biomechanics
Spring. 3 credits. Prerequisites: ENGRD 202 and 203, or permission of instructor. Offered alternate years.
Modeling and simulation of biomechanical systems using mechanics, dynamics, and control principles. Physiology of neurons and muscles introduced and related to the production of force and movement in biological systems. Representation of neuromuscular systems as simultaneous equations. Exploration of the muscular redundancy problem using optimization methods and general-purpose languages (such as *Mathematica* or MATLAB). Selected clinical applications.

[M&AE 464 Orthopaedic Tissue Mechanics
Spring. 3 credits. Prerequisites: ENGRD 202 and M&AE 325 or permission of instructor. Offered alternate years. Not offered 2001–2002.
Applications of mechanics and materials principles to orthopaedic tissues. Physiology of bone, cartilage, ligament, and tendon introduced and related to mechanical function. Mechanical behavior of skeletal tissues in the laboratory. Functional adaptation of these tissues to their mechanical environment. Tissue engineering of replacement structures.]

M&AE 470 Finite Element Analysis for Mechanical and Aerospace Design
Spring. 3–4 credits. (4 credits as M&AE design elective for M&AE seniors) Prerequisite: senior standing or permission of instructor. Evening examinations. Term project. Fulfills computer applications requirement for M&AE students.
Introduction to linear finite element static and dynamic analysis for discrete and distributed mechanical and aerospace structures. Prediction of load, deflection, stress, strain, and temperature distributions. Major emphasis on underlying mechanics and numerical methods. Introduction to computational aspects via educational and commercial software (such as *intuitive FEM, MATLAB,* and *ANSYS*). Selected mechanical and aerospace applications.

M&AE 478 Feedback Control Systems (also CHEME 472 and ECE 471)
Fall. 4 credits. Prerequisites; one of the following: CHEME 372, ECE 301, M&AE 326, or permission of instructor.
Analysis techniques, performance specifications, and analog-feedback-compensation methods for single-input, single-output, linear, time-invariant systems. Laplace transforms and transfer functions are the principal mathematical tools. Design techniques include root-locus and frequency response methods. Includes laboratory that examines modeling and control of representative dynamic processes.

M&AE 479 Modeling and Simulation of Mechanical and Aerospace Systems (also M&AE 579)
Fall. 3 or 4 credits. Prerequisite: senior engineering standing or permission of instructor. Evening examinations. Fulfills M&AE design elective if taken for 4 credits. Fulfills computer applications requirement for M&AE students. Limited enrollment of M.Eng. students by permission of instructor only. F. Valero-Cuevas.
Analysis and simulation of linear and nonlinear systems. Representation of discrete and distributed dynamical systems by state-variable models. Time- and frequency-domain simulation via general-purpose languages (such as MATLAB or Mathematica) and special-purpose simulation software (such as Simulink). Selected applications from diverse fields.

M&AE 486 Automotive Engineering Design
Spring. 4 credits. Prerequisite: senior standing. Fulfills field design requirement.
For description, see M&AE 386.

M&AE 514 Design for Manufacture and Assembly
Spring. 3 or 4 credits; (4 credit option provides design credit for M&AE seniors). Prerequisites: ENGRG 102 and M&AE 212 or 412, and introductory probability and statistics, or permission of instructor.
Nominal DFMA (Design for Manufacture & Assembly) and variational DFMA are covered in two parallel streams. The nominal stream is based on readings in a popular text that surveys the characteristics of manufacturing and assembly processes that influence the design of parts and products. The second stream, covered through lectures and diverse reading, addresses dimensional variability and its control through parametric and geometric tolerances, dimensional metrology, and aspects of statistical quality and process control.

M&AE 525 Mechatronics Systems Engineering Project
Fall, spring. 4 credits each term (must be taken for 8 credits). Limited enrollment; engineering seniors and Master of Engineering students only. Corequisite: Applied Systems Engineering I or permission of instructor. Fulfills Master of Engineering project requirement, Systems Engineering Option project requirement, and undergraduate design elective.
Project-based introduction to systems engineering with a focus on system design, systems and technology integration, and systems analysis. Approximately 30 students from the various engineering disciplines design, construct, and fully test several teams of fully autonomous, mobile robots. These teams engage in head to head competitions at the end of the spring semester. There are approximately six lectures per semester, and weekly group meetings with the instructor. The project involves vehicle design, real-time feedback control and trajectory generation, microprocessor design and implementation, wireless communication, computer vision, and artificial intelligence.

M&AE 565 Biomechanical Systems—Analysis and Design
Fall. 3 or 4 credits. Prerequisites: undergraduate courses in dynamics and strength of materials, (e.g. T&AM/ENGRD 202 and 203) and senior standing, graduate standing, or permission of instructor.
Selected topics from the study of the human body as a mechanical system. Emphasis on the modeling, analysis, and design of biomechanical systems frequently encountered in orthopaedic engineering, especially bone-implant systems.

M&AE 570 Simulation of Mechanical and Aerospace Systems (also M&AE 470)
Spring. 4 credits. Prerequisite: graduate standing or permission of instructor. Evening examinations. Term project.
Graduate version of M&AE 470. For description, see M&AE 470.

[M&AE 571 Applied Dynamics
Fall. 3 credits. Prerequisites: graduate standing, seniors with T&AM/ENGRD 203, M&AE 326 or permission of instructor. 2 lectures. Not offered 2001–2002.
Introduction to multibody dynamics; dynamics of rigid bodies; Newton-Euler methods, Lagrangian dynamics, principle of virtual power (Kane-Jourdain methods); and applications to robotics, space dynamics of satellites, electro-mechanical systems.]

M&AE 579 Modeling and Simulation of Mechanical and Aerospace Systems
Fall. 4 credits. Prerequisite: graduate standing or permission of instructor. Evening examinations. Term project.
For description, see M&AE 479.

M&AE 612 Materials Processing: Theory and Applications
Fall. 4 credits. Prerequisite: graduate standing, or permission of instructor.
Basic principles governing the inelastic behavior of solids. Slab-analysis models and bound theorems for problems of forging, extrusion, and rolling. Analysis of sheet-metal forming including limit diagrams and springback. Defect initiation during forming processes. Basic solidification processes. Morphological instability of a solid/liquid interface, solidification microstructures, solute redistribution, microsegregation, and macrosegregation. Thermomechanical defects in casting processes. Rapid solidification microstructures. Behavior and forming of metal alloys in the semisolid state.

[M&AE 613 Computational Methods in Materials Processing
Spring. 4 credits. Prerequisite: M&AE 612 or permission of instructor. Not offered 2001–2002.
Thermodynamic framework for inelastic constitutive models, temperature and rate dependence, phenomenology of plastic deformation. The finite-element method for rigid plastic flow analysis of extrusion, drawing, forging, rolling, and plate bending. Integration of viscoplastic models, geometry updating, boundary conditions, friction at tool/workpiece interface, modeling of incompressibility, iterative process, and applications to process design. Comparison of the flow formulation with an elasto-plastic analysis. Analysis of hot forming processes. Procedures for heat-transfer analysis. Preform design. Modeling of plastic anisotropy with applications to sheet forming. Modeling of heat flow and deformation on casting processes.]

M&AE 615 Experiments in Materials Processing
Fall. 4 credits. Prerequisite: M&AE 680 (finite elements) or permission of instructor.
This course focuses on experiments and simulations related to the mechanical properties of materials and materials processing. A general introduction to sensors and instrumentation for engineering measurements is also included. Testing for mechanical properties/model parameter characterization and simple boundary value problems: linear elasticity, inelastic deformation, fatigue, and fracture, including rate and temperature effects. Process simulation experiments including forging, extrusion, rolling, and ironing may also be conducted. In addition, an emphasis is placed on the experiment/simulation interface. Students perform analyses including finite element modeling to correlate and predict materials behaviors observed in the experiments. These analyses include linear elasticity behavior, state variable plasticity modeling, and fracture mechanics.

M&AE 655 Composite Materials (also MS&E 655 and T&AM 655)
Spring. 4 credits.
For description, see T&AM 655.

[M&AE 663 Advanced Topics in Neuromuscular Biomechanics
Spring. 3 credits. Permission of instructor only. Offered alternate years. Not offered 2001–2002. F. Valero-Cuevas.
Advanced topics in modeling and simulation of biomechanical systems using mechanics, dynamics, and control principles. Mathematical representation of the functional interactions among neurons, muscles, and skeletal structures. Numerical prediction of force and movement in biological systems, and exploration of muscle coordination using optimization methods and general-purpose languages (such as Mathematica or MATLAB). Project-based investigation of clinically relevant topics.]

M&AE 664 Mechanics of Bone
Spring. 3 credits. Prequisites: graduate standing or permission of instructor. Offered alternate years.
This course focuses on current methods and results in skeletal research, focusing on bone. Topics include skeletal anatomy and physiology, experimental and analytical methods for determination of skeletal behavior, mechanical behavior of bone tissue, and skeletal functional adaptation to mechanics.

M&AE 676 Model-Based Estimation
Fall. 3 credits. Prerequisites: linear algebra, differential equations, and MATLAB programming. Open to M.S./Ph.D.; others by permission of the instructor.
This course covers a variety of ways in which models and experimental data can be used to estimate model quantities that are not directly measured. The two main estimation methods that are presented are least-squares estimation

for general problems and Kalman filtering for dynamic systems problems. Techniques for linear models are taught as are techniques for nonlinear models. Both theory and application are presented. The course includes a final programming project.

M&AE 677 Robust and Optimal Control
Spring. 4 credits. Prerequisite: M&AE 478/ ECE 471/CHEME 472 (or equivalent), ECE 521 (or equivalent), graduate standing, or permission of instructor.
An introduction to model based control of multi-input, multi-output systems. Emphasis on design techniques which result in closed loop systems that are insensitive to modeling errors and which achieve a pre-specified level of performance. Topics include Lp spaces and performance measures, model reduction and approximation, H2 and H-infinity optimal control, explicit models of system uncertainty, and the analysis of uncertain control systems. Most of the design and analysis tools developed in the course are in the form of linear matrix inequalities, or semidefinite programs. Each student is expected to: (1) give a presentation on a research paper, which is chosen from a list provided by the instructor, **or** (2) to complete a design project applying the techniques developed in the course.

M&AE 680 Finite Element Analysis (also CEE 772 and T&AM 666)
Spring. 3 credits. Prerequisites: T&AM 663 or equivalent.
Conceptual, theoretical, and practical bases for finite element analysis in engineering, with emphasis on structural, mechanical, and thermal problems. Focuses on the FEM as a method for numerically solving partial differential equations. Topics include: strong and weak problem forms; weighted-residual and variational formulations; formulation of elliptic, parabolic, hyperbolic, and eigenvalue problems; and convergence and error estimation; and various kinds of elements.

[MAE 712 Mechanics of Materials with Oriented Microstructures
Spring. 4 credits. Prerequisites: T&AM 663 and MAE 680 (or equivalents). Second year standing in MS/Ph.D. program. Offered alternate years. Not offered 2001–2002.
The focus of this course is the evaluation of mechanical properties from knowledge of the material microstructure, with attention to anisotropic elastic and plastic behaviors. Topics include: mathematical and mechanics preliminaries; mathematical foundations of orientations, including parameterizations, symmetries and fibers; construction and sampling of orientation distributions; hypotheses used to link macro and micro length scales; methods for evaluation of effective elastic and plastic moduli; evolution of orientations and orientation distributions with deformation. Applications to polycrystalline solids (metal alloys and minerals), composite materials, biomaterials (soft tissues), and polymers.]

Energy, Fluids, and Aerospace Engineering

M&AE 305 Introduction to Aeronautics
Fall. 3 credits. Prerequisite: T&AM/ENGRD 203; limited to upperclass engineers, others with permission of instructor.
Introduction to aerodynamic design of aircraft. Principles of incompressible and compressible aerodynamics, boundary layers, and wing theory. Description and performance of reciprocating and jet propulsion engines; propeller theory. Design analyses focus on transonic passenger airplanes and small supersonic jets.

M&AE 306 Spacecraft Engineering
Spring. 3 credits. Junior and senior engineering students.
Introduction to spacecraft design from launch, through orbital operation, to reentry. Topics covered include space missions, space environment, orbital mechanics, rocket theory, and reentry. Emphasis on satellites orbiting the Earth. Discussions of current problems and trends in spacecraft operation and development.

M&AE 400 Components and Systems: Engineering In a Social Context (also S&TS 400)
Spring. 3 credits. Prerequisites: upperclass standing, 2 years of college physics. Serves as an approved elective but not as a field elective in mechanical engineering. Offered alternate years.
This course addresses, at a technical level, broader questions than are normally posed in the traditional engineering or physics curriculum. Through the study of individual cases such as the Strategic Defense Initiative (SDI), the National Missile Defense, supersonic transport, and the automobile and its effect on the environment, we investigate interactions between the scientific, technical, political, economic, and social forces that are involved in the development of engineering systems.

M&AE 401 Components and Systems: Engineering in a Social Context
Spring. 4 credits. Prerequisites: senior standing, 2 years of college physics. Fulfills field design requirement. Offered alternate years.
For description, see M&AE 400.

M&AE 423 Intermediate Fluid Dynamics
Spring. 3 credits. Prerequisite: M&AE 323.
This course builds on the foundation of M&AE 323. Emphasis is on both the calculation of real flows (both engineering and environmental) and fundamental principles. Topics covered include some exact solutions to the Navier-Stokes equations, boundary layers, wakes and jets, separation, convection, stratified and rotating flows, fluid instabilities, turbulence, and chaos.

M&AE 449 Combustion Engines
Spring. 3 credits. Prerequisites: ENGRD 221 and M&AE 323.
Introduction to combustion engines, with emphasis on the application of thermodynamic and fluid-dynamic principles affecting their performance. Chemical equilibrium and kinetics, ideal-cycle analyses, deviations from ideal processes, engine breathing, combustion knock. Formation and control of undesirable exhaust emissions.

M&AE 453 Computer-Aided Engineering: Applications To Biomedical and Food Processes
Spring. 3 credits. Prerequisite: computer programming (ABEN 151 or COM S 100) and heat and mass transfer (ABEN 350 or equivalent).

M&AE 458 Introduction to Nuclear Science and Engineering (also A&EP 403, ECE 403 and NS&E 403)
Fall. 3 credits. Prerequisites: PHYS 214 and MATH 294.
For description, see NS&E 403.

M&AE 459 Introduction to Controlled Fusion: Principles and Technology (also A&EP 484, ECE 484, and NS&E 484)
Spring. 3 credits. Prerequisites: PHYS 112, 213, and 214, or equivalent background in electricity and magnetism and mechanics; and permission of instructor. Intended for seniors and graduate students. Offered on demand.
For description, see NS&E 484.

M&AE 506 Aerospace Propulsion Systems
Spring. 3 credits. Prerequisite: M&AE 323 or permission of instructor. Offered alternate years.
Application of thermodynamic and fluid-mechanic principles to design and performance analysis of aerospace systems. Jet propulsion principles, including rockets. Electric propulsion. Future possibilities for improved performance.

[M&AE 507 Dynamics of Flight Vehicles
Spring. 3 credits. Prerequisites: M&AE 305 and M&AE 323 or permission of instructor. Offered alternate years. Not offered 2001–2002.
Introduction to stability and control of atmospheric-flight vehicles. Review of aerodynamic forces and methods for analysis of linear systems. Static stability and control. Small disturbance equations of unsteady motion. Dynamic stability of longitudinal and lateral-directional motions; transient response. At the level of *Dynamics of Flight: Stability and Control* by Etkin.]

M&AE 523 Intermediate Fluid Dynamics with CFD
Spring. 4 credits. Prerequisites: graduate standing or permission of instructor.
This course is intended for M.Eng. students who wish to take a single fluid dynamics course. Students desiring more intensive treatment should consider M&AE 601 and one or more of M&AE 636, M&AE 736, and M&AE 737. This class co-meets with M&AE 423. This course includes an extensive CFD design project.

M&AE 543 Combustion Processes
Fall. 3 credits. Prerequisite: graduate standing or permission of instructor.
An introduction to combustion and flame processes, with emphasis on fundamental fluid dynamics, heat and mass transport, and reaction-kinetic processes that govern combustion rates. Topics covered include: thermochemistry, kinetics, vessel explosions, laminar premixed and diffusion flames, droplet combustion, and combustion of solids.

M&AE 601 Foundations of Fluid Dynamics and Aerodynamics
Fall. 4 credits. Prerequisite: graduate standing or permission of instructor.
Foundations of fluid mechanics from an advanced viewpoint, including: formulation of continuum fluid dynamics; surface phenomena and boundary conditions at interfaces; fundamental kinematic descriptions of fluid flow, tensor analysis, derivation of the Navier-Stokes equations and energy equation for

compressible fluids; and sound waves, viscous flows, boundary layers, and potential flows.

[M&AE 602 Fluid Dynamics At High Reynolds Numbers
Spring. 4 credits. Prerequisite: M&AE 601. Offered alternate years. Not offered 2001–2002.
Analysis and discussion of a wide range of specific flows and flow regimes characterized by high Reynolds number are provided. Potential flows, conformal transformations, slender-body theory and Kelvin's impulse are included. Laminar viscous flows are studied, including fully-diffused flows, "exact" solutions, and boundary layers. Compressible flows are treated, including propagation and viscous decay of sound and shock waves and their decay, and the method of characteristics for analysis of such problems. Stratified flows, especially gravity and capillary waves, are analyzed. Various stability problems associated with high Reynolds number flows are discussed, and, time permitting, isotropic turbulence, Reynolds stress, and mixing-length ideas may be treated briefly.]

[M&AE 603 Compressible Fluid Dynamics
Fall. 4 credits. Graduate standing or permission of instructor. Not offered 2001–2002.
Fundamentals of compressible gas dynamics are described using thermodynamics and fluid properties, together with isentropic and viscous andulseous flow theories; normal and oblique shock-waves; Prandtl-Meyer expansion fans; sound waves and acoustics; and duct flows including effects of area, friction, and heat interaction. Applications include high-speed aerodynamics, including hypersonics combustor design.]

[M&AE 608 Physics of Fluids
Spring. 4 credits. Prerequisite: graduate standing or permission of instructor. Not offered 2001–2002.
Behavior of a gas is considered at the microscopic level. Introduction to kinetic theory: velocity distribution, collisions, Boltzmann equation. Quantum theory: postulates of quantum mechanics, internal structure, rigid rotator, harmonic oscillator, one-electron atom. Statistical mechanics: partition functions, relation to thermodynamics, calculations of thermodynamic properties. Chemical rate processes.]

[M&AE 636 Elements of Computational Aerodynamics
Fall. 4 credits. Prerequisites: graduate standing and a graduate-level course in fluid mechanics. Not offered 2001–2002.
Topics relevant to numerical solution of problems in aerodynamics and fluid mechanics. Analysis and application of computational techniques appropriate for solution of inviscid or high Reynolds number fluid flow problems. Course has common lectures with M&AE 736, but is more applications oriented and uses commercial software for all computational exercises.]

M&AE 643 Laminar Flames
Spring. 2 credits. Prerequisite: graduate standing or permission of instructor.
Laminar flames are of practical importance in combustion systems, and they provide a complex example of laminar reactive flows. This course examines the behavior of laminar flames and the chemical and transport processes involved. The emphasis of the course is on using computational tools to calculate flame properties. The topics covered include thermodynamic equilibrium, chemical kinetics, reactor studies, conservation equations, transport properties, premixed flames, and nonpremixed flames.

[M&AE 645 Turbulent Reactive Flows
Fall. 2 credits. Prerequisite: graduate standing or permission of instructor. Offered alternate years; Not offered 2001–2002.
Large turbulent reactive flows occur in combustion devices, the chemical process industry, the atmosphere, oceans, and elsewhere. In the last decade, substantial progress has been made in the understanding of these flows, through both experimental and computational approaches. This course focuses on turbulent, nonpremixed combustion and describes: the different phenomena involved, the basic processes and governing equations, experimental techniques and observations, and a broad range of modeling approaches. The material covered is relevant to other single-phase turbulent reactive flows. Class meets, on average, once per week.]

M&AE 651 Conduction and Radiation Heat Transfer
Fall, weeks 1–7. 2 credits. Prerequisite: graduate standing; undergraduates by permission of instructor. K. E. Torrance.
An intermediate treatment of heat conduction and thermal radiation. Deductions from the first and second laws of thermodynamics. The conductive transport equation. Physical mechanism of thermal conductivity. Steady, transient, and some multidimensional conduction. The radiative transport equation. Surface and gas radiation properties. Radiant exchange between surfaces and volumes. Molecular and particulate scattering. Radiosity and volume integral formulations. At the level of, but extends, *Heat Transfer*, by Bejan.

M&AE 652 Convection Heat Transfer
Fall, weeks 8–14. 2 credits. Prerequisite: graduate standing; undergraduates by permission of instructor. K. E. Torrance.
An intermediate treatment of convection heat transfer. Governing equations developed in integral and differential forms. Boundary layers. Laminar and turbulent flows. Internal and external, forced and free convection. Entropy and system arguments for optimal design. Parameter identification. At the level of, but extends, *Heat Transfer*, by Bejan.

[M&AE 732 Analysis of Turbulent Flows
Spring. 4 credits. Prerequisite: M&AE 601 or permission of instructor. Offered alternate years; Not offered 2001–2002.
Study of methods for calculating the properties of turbulent flows. Characteristics of turbulent flows. Direct numerical simulations, and the closure problem. Reynolds-stress equation: effects of dissipation, anisotropy, deformation. Transported scalars. Probability density functions (pdf's): transport equations, relationship to second-order closures, stochastic modeling, and the Langevin equation. The course emphasizes comparison of theory with experiment. Large-eddy simulations: filtered and residual motions, Smagorinsky, and dynamic models.]

[M&AE 733 Stability of Fluid Flow
Fall, on demand. 4 credits. S-U grades only. Prerequisite: graduate standing or permission of instructor. Not offered 2001–2002.
Basic stability and bifurcation theory in fluid systems. "Open" flow systems: inviscid Kelvin-Helmholtz, Rayleigh-Taylor instability, and capillary instability of liquid jets. Stability of parallel shear flows and of concentrated vortex flows. Spatial development of linearly unstable motion: "absolute" and "convective" instability. Thermal, double-diffusive, and related instabilities. Post-bifurcation behavior: the Ginzburg-Landau (Stewartson-Stuart) and Davey-Hocking-Stewartson amplitude equations. Phase dynamics and pattern formation. Stability of periodic motion: Floquet theory. Secondary instabilities; Eckhaus instability, Busse "balloons." Energy stability theory. Effects of symmetry. Taylor-Couette instability.]

M&AE 734 Turbulence and Turbulent Flow
Fall. 4 credits. Prerequisite: M&AE 601, graduate standing, or permission of instructor.
Topics include the dynamics of buoyancy and shear-driven turbulence, boundary-free and bounded shear flows, second-order modeling, the statistical description of turbulence, turbulent transport, and spectral dynamics.

[M&AE 736 Theory of Computational Aerodynamics
Fall. 4 credits. Prerequisites: graduate standing, an advanced course in continuum mechanics or fluid mechanics, and some FORTRAN programming experience. Not offered 2001–2002.
Numerical methods to solve inviscid and high-Reynolds-number fluid-dynamics problems, including finite-difference, finite-volume, and surface-singularity methods. Accuracy, convergence, and stability; treatment of boundary conditions and grid generation. Focus on hyperbolic (unsteady flow with shock waves) and mixed hyperbolic-elliptic (steady transonic flow) problems. Assignments require programming a digital computer.]

[M&AE 737 Computational Fluid Mechanics and Heat Transfer
Fall. 4 credits. Prerequisites: graduate standing; an advanced course in continuum mechanics, heat transfer, or fluid mechanics; and some FORTRAN, C, or C++ programming experience. Not offered 2001–2002.
Numerical methods are developed for the elliptic and parabolic partial differential equations that arise in fluid flow and heat transfer when convection and diffusion are present. Finite-difference, finite-volume, and some spectral methods are considered, together with issues of accuracy, stability, convergence, and conservation. Current methods are reviewed. Emphasis is on steady and unsteady essentially incompressible flows. Assigned problems are solved on a digital computer.]

Special Offerings

M&AE 490 Special Investigations in Mechanical and Aerospace Engineering
Fall, spring. Credit TBA. Limited to undergraduate students. Prerequisite: permission of instructor.
Intended for an individual student or a small group of students who want to pursue a particular analytical or experimental investigation outside of regular courses or for informal instruction supplementing that given in regular courses.

M&AE 491 Design Projects in Mechanical and Aerospace Engineering
Fall, spring. Credits TBA. Prerequisite or corequisite: M&AE 428. Fulfills field design requirement.
Intended for individual students or small groups of students who want to pursue particular design projects outside of regular courses.

M&AE 545 Energy Seminar (also ECE 587 and NS&E 545)
Fall, spring. 1 credit. May be taken for credit both semesters.
For description, see NS&E 545.

M&AE 594 Manufacturing Seminar (also OR&IE 893–894)
Fall, spring. 1 credit.
For description, see OR&IE 893–894.

M&AE 690 Special Investigations in Mechanical and Aerospace Engineering
Fall, spring. Credit TBA. Limited to graduate students.

M&AE 695 Special Topics in Mechanical and Aerospace Engineering
Fall, spring. Credit TBA. Graduate standing and permission of instructor.
Special lectures by faculty members on topics of current research.

M&AE 791 Mechanical and Aerospace Research Conference
Fall, spring. 1 credit each term. S-U grades only. For graduate students involved in research projects.
Presentations on research in progress by faculty and students.

M&AE 799 Mechanical and Aerospace Engineering Colloquium
Fall, spring. 1 credit each term. Credit limited to graduate students. All students and staff invited to attend.
Lectures by visiting scientists and Cornell faculty and staff members on research topics of current interest in mechanical and aerospace science, especially in connection with new research.

M&AE 890 Research in Mechanical and Aerospace Engineering
Credit TBA. Prerequisite: candidacy for M.S. degree in mechanical or aerospace engineering or approval of director.
Independent research in an area of mechanical and aerospace engineering under the guidance of a member of the faculty.

M&AE 990 Research in Mechanical and Aerospace Engineering
Credit TBA. Prerequisite: candidacy for Ph.D. degree in mechanical or aerospace engineering or approval of director.
Independent research in an area of mechanical and aerospace engineering under the guidance of a member of the faculty.

NUCLEAR SCIENCE AND ENGINEERING

NS&E 121 Fission, Fusion, and Radiation (also A&EP 121 and ENGRI 121)
Spring. 3 credits. S-U grades optional for students outside the College of Engineering. K. B. Cady.
This is a course in the Introduction to Engineering series. For description, see ENGRI 121.

NS&E 403 Introduction to Nuclear Science and Engineering (also A&EP 403, ECE 403, and M&AE 458)
Fall. 3 credits. Prerequisites: PHYS 214 and MATH 294. K. B. Cady.
This course is designed for juniors or seniors from any engineering field who want to prepare for graduate-level nuclear science and engineering courses at Cornell or elsewhere. It can also serve as a basic course for those who do not intend to continue in the field.
Introduction to the fundamentals of nuclear reactors. Topics include: an overview of the field of nuclear engineering; nuclear structure, radioactivity, and reactions; interaction of radiation and matter; and neutron moderation, neutron diffusion, the steady-state chain reaction, and reactor kinetics. At the level of *Introduction to Nuclear Engineering*, by Lamarsh, third edition.

NS&E 484 Introduction to Controlled Fusion: Principles and Technology (also A&EP 484, ECE 484, and M&AE 459)
Spring. 3 credits. Prerequisites: PHYS 112, 213, and 214, or equivalent background in electricity and magnetism and mechanics; and permission of instructor. Intended for seniors and graduate students. Offered on demand. D. A. Hammer.
Introduction to the physical principles and various engineering aspects underlying power generation by controlled fusion. Topics include: fuels and conditions required for fusion power, and basic fusion-reactor concepts; fundamental aspects of plasma physics relevant to fusion plasmas, and basic engineering problems for a fusion reactor; and an engineering analysis of proposed magnetic and/or intertial confinement fusion-reactor designs.

NS&E 509 Nuclear Physics for Applications
Fall. 3 credits. Prerequisites: sophomore physics and math, or permission of instructor; some upper-division physics is desirable. Primarily for graduate students, especially those with a major or minor in Nuclear Science and Engineering; also open to qualified undergraduates. V. O. Kostroun.
A first course in nuclear physics. Systematic presentation of nuclear phenomena and processes that underlie applications ranging from nuclear power (fission and fusion), to nuclear astrophysics, to nuclear analytical methods for research in nonnuclear fields. Radioactivity, nuclear reactions, and interaction of radiation with matter. At the level of *Radiochemistry and Nuclear Methods of Analysis*, by Ehmann and Vance and *Nuclear and Radiochemistry*, by Friedlander, et al.

NS&E 521 Radiation Effects in Materials
Fall. 3 credits. Prerequisite: introductory course in nuclear science and materials science. K. Ünlü.
Radiation effects in fission and fusion reactors. Displacement of atoms by neutrons, electrons and ions, radiation induced defects, diffusion of point defects in the crystalline lattice, void swelling, and other radiation induced changes in mechanical properties of alloys. Radiation effects in fission and fusion reactor materials. Nuclear reactor fuels. At the level of *Fundamental Aspects of Nuclear Reactor Fuel Elements*, by D. R. Olander.

NS&E 545 Energy Seminar (also ECE 587 and M&AE 545)
Fall, spring. 1 credit. May be taken for credit both semesters. K. Ünlü.
Energy resources, their conversion to electricity or mechanical work, and the environmental consequences of the energy cycle are discussed by faculty members from several departments in the university and by outside experts. Examples of topics to be surveyed include: energy resources and economics; coal-based electricity generation; nuclear reactors; solar power; energy conservation by users; and air pollution control.

NS&E 551 Nuclear Measurements in Research
Spring. 3 credits. Prerequisite: PHYS 214 or 218, or permission of instructor; some upper-division physics desirable. Primarily for graduate students in archaeology, geology, chemistry, biology, materials science, and other fields in which nuclear methods are used. Open to qualified undergraduates. K. Ünlü.
Lectures on interaction of radiation with matter, radiation protection, and nuclear instruments. Experiments on radiation detection and measurement; electronic instrumentation, including computerized systems; activation analysis; and emerging applications such as prompt gamma analysis and neutron radiography. The TRIGA reactor is used. Emphasis is on methods used in nonnuclear fields. At the level of *Radiochemistry and Nuclear Methods of Analysis*, by Ehmann and Vance.

NS&E 590 Independent Study
Fall, spring. 1–4 credits. Grade option letter or S-U.
Independent study or project under guidance of a faculty member.

NS&E 591 Project
Fall, spring. 1–6 credits.
Master of Engineering or other project under guidance of a faculty member.

NS&E 612 Nuclear Reactor Theory
Fall. 4 credits. Prerequisites: 1 year of advanced calculus and some nuclear physics. K. B. Cady.
Physical theory of fission reactors; fission and neutron interactions with matter; theory of neutron diffusion; slowing down and thermalization; calculations of criticality and neutron-flux distribution in nuclear reactors; and reactor kinetics. At the level of *Nuclear Reactor Theory*, by Lamarsh.

NS&E 633 Nuclear Reactor Engineering (also A&EP 633)
Fall. 4 credits. Prerequisite: introductory course in nuclear engineering. Offered on demand. K. B. Cady.
The fundamentals of nuclear reactor engineering, reactor siting and safety, fluid flow and heat transfer, control, environmental effects, and radiation protection.

OPERATIONS RESEARCH AND INDUSTRIAL ENGINEERING

OR&IE 310 Industrial Systems Analysis
Spring. 4 credits. Prerequisite: ENGRD 270, or permission of instructor. J. Callister.
Design of production facilities, including engineering economy, materials handling

process design, and facility layout. Covers operations analysis, including process scheduling, process evaluation, procedural analysis, project management, methods analysis and design, work measurement, inventory control, job evaluation, and quality engineering and control.

OR&IE 320 Optimization I
Fall. 4 credits. Prerequisite: MATH 221 or 294. R. Bland.
Formulation of linear programming problems and solutions by the simplex method. Related topics such as sensitivity analysis, duality, and network programming. Applications include such models as resource allocation and production planning. Introduction to interior-point methods for linear programming.

OR&IE 321 Optimization II
Spring. 4 credits. Prerequisite: OR&IE 320 or equivalent. D. Shmoys.
A variety of optimization methods stressing extensions of linear programming and its applications but also including topics drawn from integer, dynamic, and nonlinear programming. Formulation and modeling are stressed as well as numerous applications.

OR&IE 350 Financial and Managerial Accounting
Fall. 4 credits. J. Callister.
Course covers: principles of accounting, financial reports, financial-transactions analysis, financial-statement analysis, budgeting, job-order and process-cost systems, standard costing and variance analysis, and economic analysis of short-term decisions.

OR&IE 360 Engineering Probability and Statistics II
Fall. 4 credits. Prerequisite: ENGRD 270 or equivalent. P. Protter.
This second course in probability and statistics provides a rigorous foundation in theory combined with the methods for modeling, analyzing, and controlling randomness in engineering problems. Probabilistic ideas are used to construct models for engineering problems, and statistical methods are used to test and estimate parameters for these models. Specific topics include: random variables, probability distributions, density functions, expectation and variance, multidimensional random variables, and important distributions including normal, Poisson, exponential, hypothesis testing, confidence intervals, and point estimation using maximum likelihood and the method of moments.

OR&IE 361 Introductory Engineering Stochastic Processes I
Spring. 4 credits. Prerequisite: OR&IE 360 or equivalent. K. Athreya.
Basic concepts and techniques of random processes are used to construct models for a variety of problems of practical interest. Topics include the Poisson process, Markov chains, renewal theory, models for queuing, and reliability.

[OR&IE 414 Using Simulation Models for Engineering Design
Spring. 4 credits. Prerequisites: an undergraduate course in probability and statistics through regression analysis, computer programming skills with a working knowledge of or willingness to learn Java, C++, or C. Corequisites: graduate or senior level course in discrete event simulation. Not offered 2001–2002.
This course examines ways for engineers to exercise simulation models efficiently to gain information. The lectures survey general techniques that are useful in most engineering and manufacturing disciplines; some specialized techniques are also presented such as Infinitesimal Perturbation Analysis Gradient Estimation, Frequency Domain Screening, Multivariate Adaptive Regression Splines and Wavelets. Students become familiar with a broad range of modeling strategies.]

OR&IE 416 Design of Manufacturing Systems
Fall. 4 credits. Senior OR&IE students only. Others by permission of instructor only. A. Muckstadt/R. Roundy.
This is a project course in which students, working in teams, design a manufacturing logistics system and conduct capacity, material flow, and cost analysis of their design. Meetings between project teams and faculty advisers are substituted for some lectures. Analytical methods for controlling inventories, planning production, and evaluating system performance are presented in lectures. Lab fee $15.

[OR&IE 431 Discrete Models
Fall. 4 credits. Prerequisites: OR&IE 320 and COM S 211, or permission of instructor. Not offered 2001–2002.
Course covers basic concepts of graphs, networks, and discrete optimization. Fundamental models and applications, and algorithmic techniques for their analysis. Specific optimization models studied include flows in networks, the traveling salesman problem, and network design.]

OR&IE 432 Nonlinear Optimization
Fall. 4 credits. Prerequisite: OR&IE 320. J. Renegar.
This course is an introduction to the practical and theoretical aspects of nonlinear optimization. Attention is given to the computational efficiency of algorithms and the application of nonlinear techniques to linear programming; e.g., interior-point methods. Methods of numerical linear algebra are introduced as needed.

[OR&IE 434 Optimization Modeling
Fall. 3 credits. Prerequisites: a grade of at least B- in OR&IE 321/521. Not offered 2001–2002.
Emphasis is on modeling complicated decision problems as linear programs, integer programs, or highly-structured nonlinear programs. Besides modeling, students are required to assimilate articles from the professional literature and to master relevant software.]

[OR&IE 435 Introduction to Game Theory
Spring. 3 credits. Not offered 2001–2002.
A broad survey of the mathematical theory of games, including such topics as: two-person matrix and bimatrix games; cooperative and noncooperative n-person games; and games in extensive, normal, and characteristic function form. Economic market games. Applications to weighted voting and cost allocation.]

OR&IE 436 A Mathematical Examination of Fair Representation
Spring. 3 credits. Prerequisites: MATH 222 or 294 or permission of instructor. R. Bland.
This course covers the mathematical aspects of the political problem of fair apportionment. The most recognizable form (in the United States) of apportionment is the determination of the number of seats in the U.S. House of Representatives awarded to each state. The constitution indicates that the apportionment should reflect the relative populations, but it does not prescribe a specific method. At first blush it appears that there is a straightforward approach that must lead to a fair, or fairest apportionment, for any fixed house size and known populations. However, indivisibility of seats leads us to interesting mathematical questions and a long, rich, and fractious political history involving many famous figures. The basic ideas extend beyond apportionment of legislatures (in both federal systems and proportional representation systems) to some other realms where indivisible resources are to be allocated among competing constituencies.

OR&IE 451 Economic Analysis of Engineering Systems
Spring. 4 credits. Prerequisites: OR&IE 320 and OR&IE 350. T. Lybbert.
Course topics include: financial planning, including cash-flow analysis and inventory flow models; engineering economic analysis, including discounted cash flows and taxation effects; application of optimization techniques, as in equipment replacement or capacity expansion models, and issues in designing manufacturing systems. Includes a student group project.

OR&IE 452 Entrepreneurship for Engineers (also MAE 461 and ENGRG 461)
Fall. 3 credits. Enrollment open to upper class engineers, others with permission of instructor. J. Callister.
For description see MAE 461.

OR&IE 462 Introductory Engineering Stochastic Processes II
Spring. 4 credits. Prerequisite: OR&IE 361 or equivalent. G. Samorodnitsky.
Course topics include: stationary processes, martingales, random walks, and gambler's ruin problems, processes with stationary independent increments, Brownian motion and other cases, branching processes, renewal and Markov-renewal processes, reliability theory, Markov decision processes, optimal stopping, statistical inference from stochastic models, and stochastic comparison methods for probability models. Applications to population growth, spread of epidemics, and other models.

OR&IE 473 Empirical Research Methods in Financial Engineering
Spring. 3 credits. Prerequisites: ENGRD 270, OR&IE 360 and 361, or their equivalents. D. Ruppert.
This course represents an advanced study of empirical research methods in financial economics. Focus is on the empirical techniques used most often in the analysis of financial markets and how they are applied to actual market data.

OR&IE 474 Statistical Data Mining
Fall. 3 credits. Prerequisites: OR&IE 360 and MATH 294 or equivalent; or permission of instructor. W. Jiang.
This course examines the statistical aspects of data mining, the effective analysis of large data sets. The first half of the course covers the process of building and interpreting statistical models in a variety of settings including multiple regression and logistic regression. The second half connects these ideas to techniques being developed to handle the large data sets that are now routinely encountered in scientific and business applications. Assignments are done

using one or more statistical computing packages.

OR&IE 476 Applied Linear Statistical Models
Spring; weeks 1–7. 2 credits. Prerequisite: ENGRD 270. Staff.
Course topics include: multiple linear regression, diagnostics, model selection, inference, one and two factor analysis of variance. Theory and applications both treated. Use of MINITAB stressed.

OR&IE 480 Information Technology
Fall. 4 credits. Pre- or corequisites: COM S/ENGRD 211, plus either OR&IE 310 or OR&IE 350. M. Eisner.
This course views information technology as the means by which computer science, operations research, and industrial engineering are brought to serve the operational and strategic needs of enterprises. As such, information technology encompasses: communications systems, information architectures, data management, development methodologies, implementation projects (with the attendant organizational design, business process analysis, requirements analysis, systems and organizational design, and implementation planning steps), operations management, electronic commerce, and more. The course takes the perspective of a professional who accesses existing computer data to analyze a problem or opportunity, uses computer tools to manage the data, develops an effective solution, and employs a computer application to implement the solution. This perspective introduces students to the ways in which information technology is currently being used throughout enterprises and how these uses are changing with the explosive growth of the Internet. Includes lectures (including guest lectures by practitioners), cases, and laboratory exercises intended to make the general concepts concrete. The course centers around a design project, in which student teams develop a solution to a business problem of their choosing and prepare a memorandum with supporting technical, financial, and process detail.

OR&IE 481 Delivering OR Solutions with Information Technology
Spring; weeks 8–14. 2 credits. Prerequisites: OR&IE 480. M. Eisner.
Study of ways in which information technology is used to deliver operations research methodology in real applications, including decision support systems, embedded operations research techniques, packaged software, web-based techniques, collaborative software, and expert systems. Several real applications are investigated.

OR&IE 490 Teaching in OR&IE
Fall, spring. Varying credit. Prerequisite: permission of instructor.
This course involves working as a TA in an OR&IE course. The course instructor assigns credits (the guideline is 1 credit per 4 hours/week of work with a limit of 3 credits).

OR&IE 499 OR&IE Project
Fall, spring. Varying credit. Prerequisite: permission of instructor.
Project-type work, under faculty supervision, on a real problem existing in some firm or institution. Opportunities in the course may be discussed with the Associate Director.

OR&IE 512 Applied Systems Engineering I (also CEE 504, COM S 504, ECE 512, M&AE 591)
Fall. 3 credits. Prerequisite: permission of instructor. R. Roundy.
For description, see M&AE 591.

OR&IE 513 Applied Systems Engineering II (also CEE 505, COM S 505, ECE 513, M&AE 592)
Spring. 3 credits. Prerequisite: Applied Systems Engineering I (CEE 504, COM S 504, ECE 512, M&AE 592, or OR&IE 512). Staff.
For description, see M&AE 592.

OR&IE 515 Design of Manufacturing Systems
Fall. 4 credits. Prerequisite: permission of instructor. Limited to graduate students in Engineering and the Business School.
For description, see OR&IE 416. Lab fee $15.

OR&IE 516 Case Studies
Fall. 1 credit. Limited to M.Eng. students in OR&IE. M. Eisner.
Students are presented with an unstructured problem that resembles a real-world situation. They work in project groups to formulate mathematical models, perform computer analyses of the data and models, and present oral and written reports.

OR&IE 518 Supply Chain Management
Spring. 3 credits. Prerequisites: one of the following OR&IE 310, OR&IE 416, OR&IE 525, or OR&IE 562. J. Muckstadt.
A supply chain is the scope of activities that convert raw materials (i.e., wheat) to finished products delivered to the end consumer (i.e., a box of cereal at the local P&C), usually spanning several corporations. Supply chain management focuses on the flow of products, information, and money through the supply chain. An overview of issues, opportunities, tools, and approaches. Emphasis is on business processes, system dynamics, control, design, re-engineering. Covers the relationship between the supply chain and the company's strategic position relative to its clients and its competition. Considers dimensions of intercorporate relationships with partners, including decision-making, incentives, and risk.

OR&IE 520 Operations Research I: Optimization I
For description, see OR&IE 320.

OR&IE 521 Optimization II
For description, see OR&IE 321.

OR&IE 522 Operations Research I: Topics in Linear Optimization
Fall. 1 credit. Pre- or corequisite: OR&IE 520. Students who have already taken OR&IE 321 or 521 should not enroll. Limited to M.Eng. students in OR&IE. Staff.
An extension of OR&IE 520 that deals with applications and methodologies of dynamic programming, integer programming, and large-scale linear programming.

OR&IE 523 Operations Research II: Introduction to Stochastic Processes I
For description, see OR&IE 361.

[OR&IE 524 Design of Manufacturing Systems II
Spring; weeks 8–14. 2 credits. Prerequisites: OR&IE 562, OR&IE 416; or by permission of instructor. Not offered 2001–2002.
This project course focuses on the design and analysis of a global corporation's operations. Working in teams, students examine issues pertaining to a prototype company on the following topics: information system design, marketing, strategy, location of facilities, organization design, manufacturing capacity, planning logistics, production planning, scheduling, inventory control, and financial analysis. Meetings between project teams and faculty are substituted for some lectures or laboratories. Analytical methods appropriate for conducting analysis are discussed in lectures.]

OR&IE 525 Production Planning and Scheduling Theory and Practice
Spring. 4 credits. Corequisite: OR&IE 320, OR&IE 360. R. Roundy.
Topics covered include: production planning, including MRP, linear programming, and related concepts. Scheduling and sequencing work in manufacturing systems. Job release strategies and control of work in process inventories. Focus is on setup time as a determinant of plans and schedules.

OR&IE 528–529 Selected Topics in Applied Operations Research
Fall, spring. Varying credit. Prerequisite: permission of instructor.
Current topics dealing with applications of operations research.

OR&IE 551 Economic Analysis of Engineering Systems
Spring. 4 credits. Prerequisites: OR&IE 320 and OR&IE 350.
Lectures concurrent with OR&IE 451. For description see OR&IE 451.

[OR&IE 552 Revenue Management
Spring; weeks 8–14. 2 credits. Prerequisites: thorough knowledge of OR&IE 360, familiarity and appreciation of time series and regression methods, and graduate standing. OR&IE 320/321 helpful but not required. Others by permission of instructor. Not offered 2001–2002.
Course covers: Revenue Management (RM) concepts, models used in practice, and possible extensions; forecasting techniques, including time series methods, booking curves, and customer preference models; demand uncensoring; overbooking, optimization with emphasis on stochastic models of demand; benefit measurement; computational and technological issues; examples from the airline and other industries.]

OR&IE 560 Engineering Probability and Statistics II
For description, see OR&IE 360.

[OR&IE 561 Queuing Theory and Its Applications
Fall. 3 credits. Prerequisite: OR&IE 361 or permission of instructor. Not offered 2001–2002.
Course covers: basic queueing models; delay and loss systems; finite source, finite capacity, balking, reneging; systems in series and in parallel; FCFS versus LCFS; busy period problems; output; design and control problems; priority systems; queueing networks; the product formula; time sharing; server vacations; and applications to equipment maintenance, computer operations and flexible manufacturing systems.]

OR&IE 562 Inventory Management
Fall. 3 credits. Prerequisite: OR&IE 321, 361, or permission of instructor. J. Muckstadt.
The first portion of this course is devoted to the analysis of several deterministic and probabilistic models for the control of single and multiple items at one of many locations. The second portion of this course is presented in an experiential learning format. The focus is on analyzing and designing an integrated production and distribution system for a global company. Applications are stressed throughout.

OR&IE 563 Applied Time-Series Analysis
Fall. 3 credits. Prerequisites: OR&IE 361 and ENGRD 270, or permission of instructor. G. Samorodnitsky.
The first part of this course treats regression methods to model seasonal and nonseasonal data. After that, Box-Jenkins models, which are versatile, widely used, and applicable to nonstationary and seasonal time series, are covered in detail. The various stages of model identification, estimation, diagnostic checking, and forecasting are treated. Analysis of real data is carried out. Assignments require computer work with a time-series package.

OR&IE 564 Introductory Engineering Stochastic Processes II
Spring. 4 credits. Prerequisite: OR&IE 361 or equivalent. Lectures concurrent with OR&IE 462.
For description, see OR&IE 462.

OR&IE 565 Applied Financial Engineering
Spring. 4 credits. Limited to M.Eng. students. P. Protter.
This course has two components: a sequence of lectures and a project. The course is co-listed with the Johnson School and is co-taught by one faculty member from each school. The lectures are given by the faculty for the course and by invited speakers from the financial industry. The project satisfies the M.Eng. project requirement.

OR&IE 567 Semester in Manufacturing Management (also NBA 650)
Spring. 15 credits. Enrollment limited to OR&IE M.Eng. students only.
For description, see NBA 650.

[OR&IE 575 Experimental Design
Spring; weeks 8–14 (alternates with 576). 2 credits. Prerequisite: OR&IE 476. Not offered 2001–2002.
Course covers: randomization, blocking, sample size determination, factorial designs, 2^p full and fractional factorials, response surfaces, Latin squares, split plots, and Taguchi designs. Engineering applications. Computing in MINITAB or SAS.]

OR&IE 576 Regression
Spring; weeks 8–14 (alternates with 575). 2 credits. Prerequisite: OR&IE 476.
Course covers: nonlinear regression, advanced diagnostics for multiple linear regression, collinearity, ridge regression, logistic regression, nonparametric estimation including spline and kernel methods, and regression with correlated errors. Computing in MINITAB or SAS.

OR&IE 577 Quality Control
Fall. 3 credits. Prerequisites: OR&IE/ ENGRD 270. B. Turnbull.
Course covers: concepts and methods for process and acceptance control; control charts for variables and attributes; process capability analysis; acceptance sampling; continuous sampling plans; life tests; and use of experimental design and Taguchi methods for off-line control.

OR&IE 581 Simulation Modeling
Fall; weeks 1–7. 2 credits. Prerequisites: programming experience and OR&IE 360 or permission of instructor. OR&IE 360 may be taken concurrently. S. Henderson.
Topics include: using models and digital computer programs to simulate the behavior of complex stochastic systems in time. Also covers modeling time and randomness, simulation languages, and generation of stochastic inputs (scalers and processes).

OR&IE 582 Simulation Analysis
Fall; weeks 8–14. 2 credits. Prerequisites: programming experience and OR&IE 360 or permission of instructor. OR&IE 360 may be taken concurrently. S. Henderson.
Course covers probabilistic and statistical methods for design of computer simulation experiments and analysis of their outputs. Also covers initialization issues, analysis of simulation outputs, variance reduction methods, optimization through simulation.

OR&IE 597 Systems Engineering Project
Fall; R grade only; spring, 8 credits. For M.Eng. students.
For M. Eng. Students enrolled in the Systems Engineering Option. A substantial, group-based design project that has a strong systems design component. The project must be approved by an ASE 1 instructor before the student enrolls in the course. (The following projects are pre-approved: FSAE, HEV, Robocup, Brain.) A formal report is required.

OR&IE 598 Master of Engineering Manufacturing Project
Fall. R grade only; spring, 5 credits. For M.Eng. students.
Project course for M.Eng. students enrolled in the Manufacturing Option coordinated by the Center for Manufacturing Enterprise.

OR&IE 599 Project
Fall. R grade only; spring, 5 credits. For M.Eng. students.
Identification, analysis, design, and evaluation of feasible solutions to some applied problem in the OR&IE field. A formal report and oral defense of the approach and solution are required.

[OR&IE 625 Scheduling Theory
Fall. 3 credits. Not offered 2001–2002. R. Roundy.
Scheduling and sequencing problems, including single-machine problems, parallel-machine scheduling, and shop scheduling. The emphasis is on the design and analysis of polynomial time optimization and approximation algorithms and on related complexity issues.]

OR&IE 626 Advanced Production and Inventory Planning
Spring. 3 credits. R. Roundy.
Introduction to a variety of production and inventory control planning problems, the development of mathematical models corresponding to these problems, and a study of approaches for finding solutions.

OR&IE 630 Mathematical Programming I
Fall. 4 credits. Prerequisites: advanced calculus and elementary linear algebra. J. Renegar.
A rigorous treatment of the theory and computational techniques of linear programming and its extensions, including: formulation, duality theory, algorithms; sensitivity analysis; network flow problems and algorithms; theory of polyhedral convex sets, systems of linear equations and inequalities, Farkas' Lemma; and exploiting special structure in the simplex method, and computational implementation.

OR&IE 631 Mathematical Programming II
Spring. 4 credits. Prerequisite: OR&IE 630. L. Trotter.
A continuation of OR&IE 630. Introduction to nonlinear programming, interior-point methods for linear programming, complexity theory, and integer programming. Includes some discussion of dynamic programming and elementary polyhedral theory.

[OR&IE 632 Nonlinear Programming
Spring. 3 credits. Prerequisite: OR&IE 630. Not offered 2001–2002.
Necessary and sufficient conditions for unconstrained and constrained optima. Topics include the duality theory, computational methods for unconstrained problems (e.g., quasi-Newton algorithms), linearly constrained problems (e.g., active set methods), and nonlinearly constrained problems (e.g., successive quadratic programming, penalty, and barrier methods).]

[OR&IE 633 Graph Theory and Network Flows
Spring. 3 credits. Prerequisite: permission of instructor. Not offered 2001–2002.
Topics covered include: directed and undirected graphs; bipartite graphs; hamilton cycles and Euler tours; connectedness, matching, and coloring; flows in capacity-constrained networks; and maximum flow and minimum cost flow problems.]

OR&IE 634 Combinatorial Optimization
Fall. 3 credits. D. Shmoys.
Topics in combinatorics, graphs, and networks, including matching, matroids, polyhedral combinatorics, and optimization algorithms.

OR&IE 635 Interior-Point Methods for Mathematical Programming
Spring. 3 credits. Prerequisites: MATH 411 and OR&IE 630, or permission of instructor. J. Renegar.
Interior-point methods for linear, quadratic, and semidefinite programming and, more generally, for convex programming. Discussion of the basic ingredients—barrier functions, central paths, and potential functions—that go into the construction of polynomial-time algorithms, and various ways of combining them. Emphasis on recent mathematical theory and the most modern viewpoints.

[OR&IE 636 Integer Programming
Spring. 3 credits. Prerequisite: OR&IE 630.
Topics covered include: discrete optimization; linear programming in which the variables must assume integral values; theory, algorithms, and applications; and cutting-plane and enumerative methods, with additional topics drawn from recent research in this area.]

[OR&IE 637 Semidefinite Programming
Spring; weeks 8–14. 2 credits. Pre- or corequisite: OR&IE 635. Not offered 2001–2002.

Course covers: linear optimization over the cone of positive semidefinite symmetric matrices; applications to control theory, eigenvalue optimization, and strong relaxations of combinatorial optimization problems; duality; computational methods, particularly interior-point algorithms.]

[OR&IE 639 Polyhedral Convexity
Spring. 3 credits. Prerequisite: basic knowledge of linear algebra. Not offered 2001–2002.
A comprehensive introduction to the geometry and combinatorics of polyhedral convex sets. Also, linear inequalities, supporting and separating hyperplanes; polarity; convex hulls, facets, and vertices; face lattices; convex cones and polytopes; minkowski sums; gale transforms; simplicial and polyhedral subdivision; and applications to linear programming, combinatorial optimization, and computational geometry.]

OR&IE 650 Applied Stochastic Processes
Fall. 4 credits. Prerequisite: a 1-semester calculus-based probability course. S. Resnick.
An introduction to stochastic processes that presents the basic theory together with a variety of applications. Topics include: Markov processes, renewal theory, random walks, branching processes, Brownian motion, stationary processes, martingales, and point processes.

OR&IE 651 Probability
Spring. 4 credits. Prerequisite: real analysis at the level of MATH 413 and a previous 1-semester course in calculus-based probability. K. Athreya.
Course covers: sample spaces, events, sigma fields, probability measures, set induction, independence, random variables, expectation, review of important distributions and transformation techniques, convergence concepts, laws of large numbers and asymptotic normality, and conditioning.

OR&IE 662 Advanced Stochastic Processes
Fall. 3 credits. Prerequisite: OR&IE 651 or equivalent. G. Samorodnitsky.
Course topics include: Brownian motion, martingales, Markov processes, and topics selected from: diffusions, stationary processes, point processes, weak convergence for stochastic processes and applications to diffusion approximations, Lévy processes, regenerative phenomena, random walks, and stochastic integrals.

OR&IE 670 Statistical Principles
Fall. 4 credits. Corequisite: OR&IE 650 or equivalent. D. Ruppert.
Topics include: review of distribution theory of special interest in statistics: normal, chi-square, binomial, Poisson, t, and F; introduction to statistical decision theory; sufficient statistics; theory of minimum variance unbiased point estimation; maximum likelihood and Bayes estimation; basic principles of hypothesis testing, including Neyman-Pearson Lemma and likelihood ratio principle; confidence interval construction; and introduction to linear models.

OR&IE 671 Intermediate Applied Statistics
Spring. 3 credits. Prerequisite: OR&IE 670 or equivalent. W. Jiang.
Course topics include: statistical inference based on the general linear model; least-squares estimators and their optimality properties; likelihood ratio tests and corresponding confidence regions; and simultaneous inference. Applications in regression analysis and ANOVA models. Covers variance components and mixed models. Use of the computer as a tool for statistics is stressed.

[OR&IE 677 Sequential Methods in Statistics
Spring. 3 credits. S-U grades only. Not offered 2001–2002.
The statistical theory of sequential design and analysis of experiments has many applications; including monitoring data from clinical trials in medical studies and quality control in manufacturing operations. Topics in this course include: classical sequential hypothesis tests, Wald's SPRT, stopping rules, Kiefer-Weiss test, optimality, group sequential methods, estimation, repeated confidence intervals, stochastic curtailment, adaptive designs, and bayesian and decision theoretic approaches.]

[OR&IE 680 Simulation
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002.
An advanced version of OR&IE 581 and 582, intended for Ph.D.-level students.]

OR&IE 728–729 Selected Topics in Applied Operations Research
Fall, spring. Credit TBA.
Current research topics dealing with applications of operations research.

OR&IE 738–739 Selected Topics in Mathematical Programming
Fall, spring. Credit TBA.
Current research topics in mathematical programming.

OR&IE 768–769 Selected Topics in Applied Probability
Fall, spring. Credit TBA.
Topics are chosen from current literature and research areas of the staff.

OR&IE 778–779 Selected Topics in Applied Statistics
Fall, spring. Credits TBA.
Topics chosen from current literature and research of the staff.

OR&IE 790 Special Investigations
Fall, spring. Credit TBA.
For individuals or small groups. Study of special topics or problems.

OR&IE 799 Thesis Research
Fall, spring. Credit TBA.
For individuals doing thesis research for master's or doctoral degrees.

OR&IE 891 Operations Research Graduate Colloquium
Fall, spring. 1 credit. Staff.
A weekly 1-1/2 hour meeting devoted to presentations by distinguished visitors, by faculty members, and by advanced graduate students on topics of current research in the field of operations research.

OR&IE 893–894 Applied OR&IE Colloquium (also M&AE 594)
893, fall; 894, spring. 1 credit each term.
A weekly meeting for Master of Engineering students. Discussion of various topics on manufacturing with faculty members and outside speakers.

THEORETICAL AND APPLIED MECHANICS

Basics in Engineering Mathematics and Mechanics

T&AM 118 Design Integration: A Portable CD Player (also ENGRI 118 and MS&E 118)
Spring. 3 credits.
This is a course in the Introduction to Engineering series. For description, see ENGRI 118.

T&AM 202 Mechanics of Solids (also ENGRD 202)
Fall, spring. 3 credits Prerequisite: PHYS 112, coregistration in MATH 293 or permission of instructor.
For description, see ENGRD 202.

T&AM 203 Dynamics (also ENGRD 203)
Fall, spring. 3 credits. Prerequisite: T&AM 202, coregistration in MATH 294, or permission of instructor.
For description, see ENGRD 203.

Engineering Mathematics

T&AM 190 Calculus for Engineers (also MATH 190)
Fall. 4 credits. Prerequisite: 3 years of high school mathematics, including trigonometry and logarithms.
For description, see MATH 190.

T&AM 191 Calculus for Engineers (also MATH 191)
Fall. 4 credits. Prerequisite: 3 years of high school mathematics, including trigonometry.
For description, see MATH 191.

T&AM 192 Calculus for Engineers (also MATH 192)
Fall, spring, or summer. 4 credits. Prerequisite: MATH/T&AM 191.
For description, see MATH 192.

T&AM 293 Engineering Mathematics (also MATH 293)
Fall, spring. 4 credits. Prerequisite: MATH/T&AM 192 plus a knowledge of computer programming equivalent to that taught in COM S 100.
For description, see MATH 293.

T&AM 294 Engineering Mathematics (also MATH 294)
Fall, spring. 4 credits. Prerequisite: MATH/T&AM 293.
For description, see MATH 294.

T&AM 310 Advanced Engineering Analysis I
Fall, spring. 3 credits. Prerequisite: MATH/T&AM 294 or equivalent.
Course covers: initial value, boundary value, and eigenvalue problems in linear ordinary differential equations. Also covers: special functions, linear partial differential equations. This is an introduction to probability and statistics. Use of computers to solve problems is emphasized.

T&AM 311 Advanced Engineering Analysis II
Spring. 3 credits. Prerequisite: MATH/T&AM 294 or equivalent (T&AM 311 can be taken without T&AM 310).

Mathematical modeling of physical and biological systems. Examples range from molecular diffusion, crystal growth, and physiological flows, to bird flight. The mathematics necessary to understand these phenomena is discussed in depth. They include probability theory, PDEs, stability analysis, complex variable analysis, and numerical analysis.

T&AM 610 Methods of Applied Mathematics I
Fall. 3 credits. Intended for beginning graduate students in engineering and science. An intensive course, requiring more time than is normally available to undergraduates (see T&AM 310–311) but open to exceptional undergraduates with permission of instructor.
Emphasis is on applications. Course covers: linear algebra, calculus of several variables, vector analysis, series, ordinary differential equations, and complex variables.

T&AM 611 Methods of Applied Mathematics II
Spring. 3 credits. Prerequisite: T&AM 610 or equivalent.
Emphasis is on applications. Course covers: partial differential equations, transform techniques, tensor analysis, calculus of variations.

T&AM 612 Methods of Applied Mathematics III
Fall. 3 credits. Prerequisite: T&AM 610 and 611 or equivalent.
Course topics include: integral transform, methods, Wiener-Hopf technique, solutions of integral equations and partial differential equations. Problems are drawn from electromagnetics, elasticity, fluid mechanics, heat transfer, and acoustics.

T&AM 613 Methods of Applied Mathematics IV
Spring. 3 credits. Prerequisite: T&AM 610 and 611 or equivalent.
Topics include asymptotic behavior of solutions of linear and nonlinear ODE (e.g., the WKB boundry layer and multiple-scale methods) and symptotic expansion of integrals (method of steepest descent, stationary phase and Laplace methods). Also covers regular and singular perturbation methods for PDE (e.g., method of composite expansions). Other topics (depending on instructor) may include: normal forms, center manifolds, Liapunov-Schmidt reductors, and Stokes phenomenon. The course may also include computer exercises at the option of the instructor.

Continuum Mechanics

T&AM 455 Introduction to Composite Materials (also CEE 475, M&AE 455 and MS&E 555)
Spring. 4 credits.
Course topics include: introduction to composite materials; varieties and properties of fiber reinforcements and matrix materials; micromechanics of stiffness and stress transfer in discontinuous fiber/matrix arrays; orthotropic elasticity as applied to parallel fibers in a matrix and lamina; theory of stiffness (tension, bending, torsion) and failure of laminates and composite plates including computer software for design; and manufacturing methods and applications for composities. There is a group component design and manufacturing paper required, and a group laboratory on laminated component fabrication.

T&AM 591 Master of Engineering Design Project I
Fall. 3–6 credits.
M. Eng. (Mechanics) project related to the mechanics of advanced composites and structures.

T&AM 592 Master of Engineering Design Project II
Spring. 5–15 credits.
M. Eng. (Mechanics) project related to the mechanics of advanced composites and structures.

T&AM 655 Composite Materials (also M&AE 655 and MS&E 655)
Spring. 4 credits.
Taught jointly with T&AM 455 using same lecture material, but also includes more advanced material and homeworks through additional lectures. Additional material includes: shear-lag models of stress transfer around arrays of fiber breaks including viscoelastic effects, statistical theories of composite strength and failure; stress distributions around holes and cuts in composite laminates; and compressive strength of composites. Laboratory on effects of holes and notches in composites.

T&AM 663 Solid Mechanics I
Fall. 4 credits.
Rigorous introduction to solid mechanics emphasizing: linear elasticity: tensors; deformations, rotations and strains; balance principles; stress; small-strain theory; linear elasticity, anisotropic and isotropic; basic theorems of elastostatics; and boundary-value problems, e.g. plates, St. Venant's solutions.

T&AM 664 Solid Mechanics II
Spring. 4 credits. Prerequisites: MATH 610 and T&AM 663, or equivalent.
Preparation for advanced courses in solid mechanics. Topics include: singular solutions in linear elasticity; plane stress, plane strain, anti-plane shear, airy stress functions; linear viscoelasticity; cracks and dislocations; classical plasticity; thermoelasticity; and three-dimensional elasticity.

T&AM 666 Finite Element Analysis (also M&AE 680 and CEE 772)
Spring. 3 credits. Prerequisites: T&AM 663 or equivalent.
For description, see M&AE 680.

T&AM 751 Continuum Mechanics and Thermodynamics
Fall. 3 credits. Prerequisites: T&AM 610 and 611; and 663 and 664 or equivalents.
Course topics include: kinematics; conservation laws; the entropy inequality; constitutive relations: frame indifference, material symmetry; and finite elasticity, rate-dependent materials, and materials with internal state variables.

T&AM 752 Nonlinear Elasticity
Spring. 3 credits. Prerequisites: T&AM 610, 611, and 751 or equivalents. Offered alternate years.
Review of governing equations. Topics include: linearization and stability; constitutive inequalities; exact solution of special problems; nonlinear string and rod theories; phase transformations and crystal defects.

T&AM 753 Fracture
Fall. 3 credits. Prerequisites: T&AM 610 or 611; and 663 and 664 or equivalents. Offered alternate years.
Course covers: fundamentals of linear elastic fracture mechanics: K, small-scale yielding, solutions of elastic crack problems, energy concepts, J-integral. Also covers: nonlinear, rate-independent, small-deformation, fracture mechanics: plastic fracture, J-integral, small-scale yielding, fields for stationary and growing cracks; failure mechanisms of polymers, ceramics, composites, and metals: void growth, load transfer between fibers, crazing; fracture testing; fatigue fracture; computation of stress intensity factors; and plate theory and fracture.

[T&AM 757 Inelasticity
Spring. 3 credits. Prerequisites: T&AM 610 and 611; and 663 and 664 or equivalents. Offered alternate years. Not offered 2001–2002.
Course covers: plasticity: dislocation slip systems; early experimental observations; general principles; limit analysis; and solution of boundary-value problems, plastic waves, one- and three-dimensional. Also covers visco-elasticity: general principles, solution of boundary-value problems.]

[T&AM 759 Boundary Element Methods
Fall. 4 credits. Prerequisites: T&AM 610 and 611; and 633 and 644 or equivalents. Offered alternate years. Not offered 2001–2002.
Introduction to boundary element methods. Solutions for potential theory, linear elasticity, diffusion, material and/or geometric nonlinearities. Modern developments: hypersingular integrals, the boundary contour methods, sensitivity analysis.]

Dynamics and Space Mechanics

T&AM 570 Intermediate Dynamics
Fall. 3 credits.
Course topics include: Newtonian mechanics; motion in rotating coordinate systems; introduction to analytical mechanics; virtual work, Langrangian mechanics; Hamilton's principle; small vibration and stability theory. Newtonian-Eulerian mechanics of rigid bodies; and gyroscopes.

T&AM 578 Nonlinear Dynamics and Chaos
Fall. 3 credits. Prerequisite: MATH/T&AM 293 or equivalent.
Introduction to nonlinear dynamics, with applications to physics, engineering, biology, and chemistry. Emphasizes analytical methods, concrete examples, and geometric thinking. Topics: one-dimensional systems; bifurcations; phase plane; nonlinear oscillators; and Lorenz equations, chaos, strange attractors, fractals, iterated mappings, period doubling, renormalization.

T&AM 671 Hamiltonian Dynamics
Spring. 3 credits. Prerequisite: T&AM 570 or equivalent. Offered alternate years.
Course topics include: review of Lagrangian mechanics, Kane's equations; Hamilton's principle, the principle of least action, and related topics from the calculus of variations; Hamilton's canonical equations; approximate methods for two-degrees-of-freedom systems (Lie transforms); canonical transformations and Hamilton-Jacobi theory; KAM theory; and Melnikov's method.

[T&AM 672 Celestial Mechanics (also ASTRO 579)
Fall. 3 credits. Offered alternate years. Not offered 2001–2002.
Course topics include: description of orbits; 2-body, 3-body, and n-body problems; Hill curves, libration points and their stability; capture problems; osculating orbital elements, perturbation equations; effects of gravitational potentials, atmospheric drag, and solar radiation forces on satellite orbits; and secular perturbations, resonances, mechanics of planetary rings.]

[T&AM 673 Mechanics of the Solar System (also ASTRO 571)
Spring. 3 credits. Prerequisite: an advanced undergraduate course in dynamics. Offered alternate years; Not offered 2001–2002.
Course topics include: gravitational potentials, planetary gravity fields; free and forced rotations; Chandler wobble, polar wander, and damping of nutation; equilibrium tidal theory, tidal heating; orbital evolution of natural satellites, resonances, spin-orbit coupling, Cassini states; long-term variations in planetary orbits; dust dynamics; dynamics of ring systems; and physics of interiors, seismic waves, free oscillations. Illustrative examples are drawn from contemporary research.]

[T&AM 675 Nonlinear Vibrations
Fall. 3 credits. Prerequisite: T&AM 578 or equivalent. Offered alternate years; not offered 2001–2002.
Quantitative analysis of weakly nonlinear systems in free and forced vibrations, perturbation methods, averaging method. Applications to problems in mechanics, physics, and biology. Additional topics may include Hopf bifurcation, Invariant manifolds, coupled oscillators, vibrations in continuous media, normal forms, and exploitation of symmetry.]

[T&AM 678 Complex Systems
Spring. 3 credits. Prerequisites: T&AM 578 or equivalent. Offered alternate years; not offered 2001–2002.
Complex systems in physics, biology, engineering, economics, and the Internet. Topics: power laws, percolation, phase transitions, scaling, and renormalization. Self-organized criticality; neural, cardiac, genetic, power grid; and financial networks. Stochastic spatial models. Evolution on rugged landscapes.]

T&AM 776 Applied Dynamical Systems (also MATH 717)
For description, see MATH 717.

Special Courses, Projects, and Thesis Research

T&AM 491–492 Project in Engineering Science
Fall, 491; spring, 492. 1–4 credits, as arranged.
Projects for undergraduates under the guidance of a faculty member.

T&AM 796–800 Topics in Theoretical and Applied Mechanics
Fall, spring. 1–3 credits, as arranged.
Special lectures or seminars on subjects of current interest. Topics are announced when the course is offered.

T&AM 890 Master's Degree Research in Theoretical and Applied Mechanics
Fall, spring. 1–15 credits, as arranged. S-U grades optional.
Thesis or independent research at the M.S. level on a subject of theoretical and applied mechanics. Research is under the guidance of a faculty member.

T&AM 990 Doctoral Research in Theoretical and Applied Mechanics
Fall, spring. 1–15 credits, as arranged. S-U grades optional.
Thesis or independent research at the Ph.D. level on a subject of theoretical and applied mechanics. Research is under the guidance of a faculty member.

FACULTY ROSTER

Abel, John F., Ph.D., U. of California at Berkeley. Prof., Civil and Environmental Engineering
Ahner, Beth A., Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Agricultural and Biological Engineering
Albright, Louis D., Ph.D., Cornell U. Prof., Agricultural and Biological Engineering
Allmendinger, Richard, Ph.D., Stanford U. Prof., Earth and Atmospheric Sciences
Aneshansley, Daniel J., Ph.D., Cornell U. Assoc. Prof., Agricultural and Biological Engineering
Anton, A. Brad, Ph.D., California Inst. of Technology. Assoc. Prof., Chemical Engineering
Archer, Lynden A., Ph.D., Stanford U. Asst. Prof., Chemical Engineering
Arms, William, Ph.D., U. of Sussex. Prof., Computer Science
Ast, Dieter G., Ph.D., Cornell U. Prof., Materials Science and Engineering
Athreya, Krishna B., Ph.D., Stanford U. Prof., Operations Research and Industrial Engineering
Avedisian, C. Thomas, Ph.D., Princeton U. Prof., Mechanical and Aerospace Engineering
Baeumner, Antje J., Ph.D., Universitat Stuttgart. Asst. Prof., Agricultural and Biological Engineering
Bailey, Graeme, Ph.D., U. of Birmingham. Prof., Computer Science
Baker, Shefford P., Ph.D., Stanford U. Asst. Prof., Materials Science and Engineering
Ballantyne, Joseph M., Ph.D., Massachusetts Inst. of Technology. Prof., Electrical and Computer Engineering
Barazangi, Muawia, Ph.D., Columbia U. Prof., Earth and Atmospheric Sciences
Bartel, Donald L., Ph.D., U. of Iowa. Prof., Mechanical and Aerospace Engineering
Bartsch, James A., Ph.D., Purdue U. Assoc. Prof., Agricultural and Biological Engineering
Batterman, Boris W., Ph.D., Massachusetts Inst. of Technology. Walter S. Carpenter, Jr. Professorship in Engineering, Applied and Engineering Physics
Berger, Toby, Ph.D., Harvard U. Irwin and Joan Jacobs Professor of Engineering, Electrical and Computer Engineering
Billington, Sarah, Ph.D., U. Texas at Austin. Asst. Prof., Civil and Environmental Engineering
Bird, John M., Ph.D., Rensselaer Polytechnic Inst. Prof., Earth and Atmospheric Sciences
Birman, Kenneth P., Ph.D., U. of California at Berkeley. Prof., Computer Science
Bisogni, James J., Ph.D., Cornell U. Assoc. Prof., Civil and Environmental Engineering
Blakely, John M., Ph.D., Glasgow U. (Scotland). Herbert Fisk Johnson Professor of Engineering, Materials Science and Engineering
Bland, Robert G., Ph.D., Cornell U. Prof., Operations Research and Industrial Engineering
Bojanczyk, Adam W., Ph.D., U. of Warsaw (Poland). Assoc. Prof., Electrical and Computer Engineering.
Booker, John F., Ph.D., Cornell U. Prof., Mechanical and Aerospace Engineering
Brock, Joel D. Ph.D., Massachusetts Inst. of Technology. Director and Assoc. Prof., Applied and Engineering Physics
Brown, Larry D., Ph.D., Cornell U. Prof., Earth and Atmospheric Sciences
Brutsaert, Wilfried H., Ph.D., U. of California at Davis. William L. Lewis Prof. of Engineering, Civil and Environmental Engineering
Buhrman, Robert A., Ph.D., Cornell U. John Edson Sweet Professor of Engineering, Applied and Engineering Physics
Burns, Joseph A., Ph.D., Cornell U. Irving Porter Church Professor of Engineering, Astronomy and Theoretical and Applied Mechanics
Burtscher, Martin, Ph.D., U. of Colorado at Boulder. Asst. Prof., Electrical and Computer Engineering
Cady, K. Bingham, Ph.D., Massachusetts Inst. of Technology. Prof., Theoretical and Applied Mechanics
Callister, John R., Ph.D., Cornell U. Kinzelberg Director of Entrepreneurship in Engineering
Campbell, Mark E., Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Mechanical and Aerospace Egineering
Cardie, Claire T., Ph.D. U. of Massachusetts at Amherst. Assoc. Prof., Computer Sciences
Carr, Paul, Ph.D., Virginia Polytechnic Inst. Visiting Prof., Civil and Environmental Engineering
Castillo-Chavez, Carlos, Ph.D., U. of Wisconsin at Madison. Prof., Theoretical and Applied Mechanics, Biometry, Applied Mathematics, Ecology and Evolutionary Biology, Statistics, Epidemiology, Latin American Studies
Cathles, Lawrence M. III, Ph.D., Princeton U. Prof., Earth and Atmospheric Sciences
Caughey, David A., Ph.D., Princeton U. Prof., Mechanical and Aerospace Engineering
Chiang, Hsiao-Dong, Ph.D., U. of California at Berkeley. Prof., Electrical and Computer Engineering
Cisne, John L., Ph.D., U. of Chicago. Prof., Earth and Atmospheric Sciences
Clancy, Paulette, Ph.D., Oxford U. (England). Assoc. Prof., Chemical Engineering
Cohen, Claude, Ph.D., Princeton U. Prof., Chemical Engineering
Coleman, Thomas F., Ph.D., U. of Waterloo. Prof., Computer Science
Colucci, Stephen J., Ph.D., SUNY. Assoc. Prof., Earth and Atmospheric Sciences
Constable, Robert L., Ph.D., U. of Wisconsin. Prof., Computer Science
Conway, Harry D., Ph.D., London U. Prof., Theoretical and Applied Mechanics
Cook, Kerry H., Ph.D., North Carolina State U. Assoc. Prof., Earth and Atmospheric Sciences
Cooke, J. Robert, Ph.D., North Carolina State U. Prof., Agricultural and Biological Engineering
Cool, Terrill A., Ph.D., California Inst. of Technology. Prof., Applied and Engineering Physics

Cowen, E. A., Ph.D., Stanford U. Asst. Prof., Civil and Environmental Engineering
Craighead, Harold G., Ph.D., Cornell U. Charles W. Lake Jr., Prof. of Engineering, Applied and Engineering Physics
D'Andrea, Raffaello, Ph.D., California Inst. of Tech. Asst. Prof., Mechanical and Aerospace Engineering
Datta, Ashim K., Ph.D., U. of Florida. Prof., Agricultural and Biological Engineering
Davidson, Rachael A., Ph.D., Stanford U. Asst. Prof., Civil and Environmental Engineering
Dawson, Paul R., Ph.D., Colorado State U. Prof., Mechanical and Aerospace Engineering
Delchamps, David F., Ph.D., Harvard U. Assoc. Prof., Electrical and Computer Engineering
Demers, Alan, Ph.D., Princeton U. Prof., Computer Science
Derry, Louis, Ph.D., Harvard U. Asst. Prof., Earth and Atmospheric Sciences
Dick, Richard I., Ph.D., U. of Illinois. Joseph P. Ripley Professor of Engineering, Civil and Environmental Engineering
Dieckmann, Rudiger, Ph.D., U. Hannover. Prof., Materials Science and Engineering
Duncan, T. Michael, Ph.D., California Inst. of Technology. Assoc. Prof., Chemical Engineering
Eastman, Lester F., Ph.D., Cornell U. Given Foundation Professor of Engineering, Electrical and Computer Engineering
Elber, Ron, Ph.D., Hebrew U. (Israel). Prof., Computer Science
Engstrom, James R., Ph.D., California Inst. of Technology. Assoc. Prof., Chemical Engineering
Escobedo, Fernando A., Ph.D., U. of Wisconsin at Madison. Asst. Prof., Chemical Engineering
Fan, K-Y Daisy, Ph.D., Cornell U. Asst. Prof., Computer Science
Farley, Donald T., Ph.D., Cornell U. J. Preston Levis Professor of Engineering, Electrical and Computer Engineering
Fine, Terrence L., Ph.D., Harvard U. Prof., Electrical and Computer Engineering
Fisher, Elizabeth M., Ph.D., U. of California at Berkeley. Assoc. Prof., Mechanical and Aerospace Engineering
Fleischmann, Hans H., Ph.D., Technische Hoch., München (Germany). Prof., Applied and Engineering Physics
Gaeta, Alexander L., Ph.D., U. of Rochester. Assoc. Prof., Applied and Engineering Physics
Gebremedhin, Kifle G., Ph.D., U. of Wisconsin. Prof., Agricultural and Biological Engineering; Civil and Environmental Engineering
Gehrke, Johannes, Ph.D., U. of Wisconsin at Madison. Asst. Prof., Computer Science
George, Albert R., Ph.D., Princeton U. John F. Carr Prof. of Mechanical Engineering, Mechanical and Aerospace Engineering
Giannelis, Emmanuel, Ph.D., Michigan State U. Prof., Materials Science and Engineering
Gossett, James M., Ph.D., Stanford U. Prof., Civil and Environmental Engineering
Gouldin, Frederick C., Ph.D., Princeton U. Prof., Mechanical and Aerospace Engineering
Greenberg, Donald P., Ph.D., Cornell U. Prof., Computer Science
Greene, Charles, Ph.D., U. of Washington. Assoc. Prof., Earth and Atmospheric Sciences
Grigoriu, Mircea D., Ph.D., Massachusetts Inst. of Technology. Prof., Civil and Environmental Engineering
Grubb, David T., Ph.D., Oxford U. (England). Assoc. Prof., Materials Science and Engineering
Guckenheimer, John, Ph.D., U. of California at Berkeley. Prof., Mathematics and Theoretical and Applied Mechanics
Haas, Zygmunt J., Ph.D., Stanford U. Assoc. Prof., Electrical and Computer Engineering
Haith, Douglas A., Ph.D., Cornell U. Prof., Agricultural and Biological Engineering
Halpern, Joseph, Ph.D., Harvard U. Prof., Computer Science
Hammer, David A., Ph.D., Cornell U. J. Carlton Ward Sr. Prof. of Electrical and Computer Engineering
Hartmanis, Juris, Ph.D., California Inst. of Technology. Walter R. Read Professor of Computer Science
Healey, Timothy J., Ph.D., U. of Illinois. Prof., Theoretical and Applied Mechanics
Heinrich, Mark A., Ph.D., Stanford U. Asst. Prof., Electrical and Computer Engineering
Hemami, Sheila, Ph.D., Stanford U. Assoc. Prof., Electrical and Computer Engineering
Henderson, Shane, Ph.D., U. of Michigan. Asst. Prof., Operations Research and Industrial Engineereing
Hopcroft, John E., Ph.D., Stanford U. Joseph Silbert Dean of Engineering, Prof., Computer Science
Hover, Kenneth C., Ph.D., Cornell U. Prof., Civil and Environmental Engineering
Hui, Chung Y., Ph.D., Harvard U. Prof., Theoretical and Applied Mechanics and Mechanical and Aerospace Engineering
Hunter, Jean B., Ph.D., Columbia U. Assoc. Prof., Agricultural and Biological Engineering
Huttenlocher, Daniel, Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Computer Science
Ingraffea, Anthony R., Ph.D., U. of Colorado. Dwight C. Baum Prof. in Engineering, Civil and Environmental Engineering
Irwin, Lynne H., Ph.D., Texas A & M U. Assoc. Prof., Agricultural and Biological Engineering
Isaacson, Michael S., Ph.D., U. of Chicago. Prof., Applied and Engineering Physics
Isacks, Bryan L., Ph.D., Columbia U. William and Katherine Snee Prof. of Earth and Atmospheric Sciences
Jackson, Peter L., Ph.D., Stanford U. Assoc. Prof., Operations Research and Industrial Engineering
Jarrow, Robert A., Ph.D., Massachusetts Inst. of Technology. Prof., Operations Research and Industrial Engineering
Jenkins, James T., Ph.D., Johns Hopkins U. Prof., Theoretical and Applied Mechanics
Jewell, William J., Ph.D., Stanford U. Prof., Agricultural and Biological Engineering
Johnson, C. Richard, Jr., Ph.D., Stanford U. Prof., Electrical and Computer Engineering
Jordan, Teresa, Ph.D., Stanford U. Prof., Earth and Atmospheric Sciences
Kan, Edwin C., Ph.D., U. of Illinois at Champaign/Urbana. Asst. Prof., Electrical and Computer Engineering
Kay, Robert W., Ph.D., Columbia U. Prof., Earth and Atmospheric Sciences
Kay, Suzanne M., Ph.D., Brown U. Prof., Earth and Atmospheric Sciences
Kelley, Michael C., Ph.D., U. of California at Berkeley. James A. Friend family Distinquished Prof., Electrical and Computer Engineering
Kintner, Paul M., Ph.D., U. of Minnesota. Prof., Electrical and Computer Engineering
Kleinberg, Jon M., Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Computer Science
Kline, Ronald R., Ph.D., U. of Wisconsin. Prof., Electrical and Computer Engineering (History of Technology)
Koch, Donald L., Ph.D., Massachusetts Inst. of Technology. Marjorie L. Hart '50 Professor of Engineering, Chemical Engineering
Kornegay, Kevin T., Ph.D., U. of California at Berkeley. Assoc. Prof., Electrical and Computer Engineering
Kostroun, Vaclav O., Ph.D., U. of Oregon. Assoc. Prof., Applied and Engineering Physics
Kozen, Dexter, Ph.D., Cornell U. Joseph Newton Pew, Jr. Professor in Engineering, Computer Science
Krusius, J. Peter, Ph.D., Helsinki U. of Technology (Finland). Prof., Electrical and Computer Engineering
Kulhawy, Fred H., Ph.D., U. of California at Berkeley. Prof., Civil and Environmental Engineering
Kusse, Bruce R., Ph.D., Massachusetts Inst. of Technology. Prof., Applied and Engineering Physics
Lee, Kelvin, Ph.D., California Inst. of Technology. Asst. Prof., Chemical Engineering
Lee, Lillian, Ph.D., Harvard U. Asst. Prof., Computer Science
Leibovich, Sidney, Ph.D., Cornell U. Samuel B. Eckert Prof. of Mechanical and Aerospace Engineering
Li, Che-Yu, Ph.D., Cornell U. Francis Norwood Bard Professor, Materials Science and Engineering
Lindau, Manfred, Ph.D., Technical U. (Berlin). Assoc. Prof., Applied and Engineering Physics
Lion, Leonard W., Ph.D., Stanford U. Prof., Civil and Environmental Engineering
Liu, Philip L.-F., Sc.D., Massachusetts Inst. of Technology. Prof., Civil and Environmental Engineering
Loucks, Daniel P., Ph.D., Cornell U. Prof., Civil and Environmental Engineering
Louge, Michel Y., Ph.D., Stanford U. Prof., Mechanical and Aerospace Engineering
Lovelace, Richard V. E., Ph.D., Cornell U. Prof., Applied and Engineering Physics
Lumley, John L., Ph.D., Johns Hopkins U. Willis H. Carrier Professor of Engineering, Mechanical and Aerospace Engineering
Luo, Dan, Ph.D., Ohio State U. Asst. Prof., Agricultural and Biological Engineering
Malliaras, George G., Ph.D., Rijksuniversiteit Groningen (Greece). Asst. Prof., Materials Science and Engineering
Manohar, Rajit, Ph.D., California Inst. of Technology. Asst. Prof., Electrical and Computer Engineering
Mbwana, John, Ph.D., Cornell U. Instructor, Civil and Enviornmental Engineering
Meyburg, Arnim H., Ph.D., Northwestern U. Prof., Civil and Environmental Engineering
Miller, Matthew, Ph.D., Georgia Tech. Assoc. Prof., Mechanical and Aerospace Engineering
Minch, Bradley A., Ph.D., California Inst. of Technology. Asst. Prof., Electrical and Computer Engineering
Montemagno, Carlo D., Ph.D., U. of Notre Dame. Assoc. Prof., Agricultural and Biological Engineering
Moon, Francis C., Ph.D., Cornell U. Joseph C. Ford Professor, Mechanical and Aerospace Engineering

Morrisett, Greg J., Ph.D., Carnegie Mellon. Asst. Prof., Computer Science
Muckstadt, John A., Ph.D., U. of Michigan. Acheson-Laibe Prof., Operations Research and Industrial Engineering
Mukherjee, Subrata, Ph.D., Stanford U. Prof., Theoretical and Applied Mechanics and Mechanical and Aerospace Engineering
Myers, Andrew, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Computer Science
Nozick, Linda K., Ph.D., U. of Pennsylvania. Assoc. Prof., Civil and Environmental Engineering
Ober, Christopher K., Ph.D., U. of Massachusetts. Francis Norwood Bard Professor, Materials Science and Engineering
Olbricht, William L., Ph.D., California Inst. of Technology. Prof., Chemical Engineering
O'Rourke, Thomas D., Ph.D., U. of Illinois. Thomas R. Briggs Professor in Engineering, Civil and Environmental Engineering
Papoulia, Katerina D., Ph.D., U. of California at Berkeley. Asst. Prof., Civil and Environmental Engineering
Parks, Thomas W., Ph.D., Cornell U. Prof., Electrical and Computer Engineering
Parlange, Jean-Yves, Ph.D., Brown U. Prof., Agricultural and Biological Engineering
Peköz, Teoman, Ph.D., Cornell U. Prof., Civil and Environmental Engineering
Phillips, Jr., Alfred, Ph.D., Howard U. Assoc. Prof., Electrical and Computer Engineering
Philpot, William D., Ph.D., U. of Delaware. Assoc. Prof., Civil and Environmental Engineering
Phoenix, S. Leigh, Ph.D., Cornell U. Prof., Theoretical and Applied Mechanics Engineering and Mechanical and Aerospace Engineering
Pingali, Keshav K., Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Computer Science
Pollack, Lois, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Applied and Engineering Physics
Pollock, Clifford R., Ph.D., Rice U. Ilda and Charles Lee Prof. of Engineering, Electrical and Computer Engineering
Pope, Stephen B., Ph.D., Imperial College of Science and Technology (England). Sibley College Professor of Mechanical Engineering, Mechanical and Aerospace Engineering
Protter, Philip, Ph.D., U. of California at San Diego. Prof., Operations Research and Industrial Engineering
Psiaki, Mark L., Ph.D., Princeton U. Assoc. Prof., Mechanical and Aerospace Engineering
Rand, Richard H., Sc.D., Columbia U. Prof., Theoretical and Applied Mechanics
Reeves, Anthony P., Ph.D., U. of Kent at Canterbury (England). Assoc. Prof., Electrical and Computer Engineering
Renegar, James, Ph.D., U. of California at Berkeley. Prof., Operations Research and Industrial Engineering
Resnick, Sidney, Ph.D., Purdue U. Prof., Operations Research and Industrial Engineering
Rhodes, Frank H. T., Ph.D., U. of Birmingham (England). Prof., Earth and Atmospheric Sciences
Riha, Susan, Ph.D, Washington State U. Prof., Earth and Atmospheric Sciences
Rosakis, Phoebus, Ph.D., California Inst. of Technology. Assoc. Prof., Theoretical and Applied Mechanics
Roundy, Robin, Ph.D., Stanford U. Assoc. Prof., Operations Research and Industrial Engineering
Ruina, Andy L., Ph.D., Brown U. Prof., Theoretical and Applied Mechanics and Mechanical and Aerospace Engineering
Ruoff, Arthur L., Ph.D., U. of Utah. Class of 1912 Professor, Materials Science and Engineering
Ruppert, David, Ph.D., Michigan State U. Prof., Operations Research and Industrial Engineering
Sachse, Wolfgang H., Ph.D., Johns Hopkins U. Meinig Family Prof. of Engineering, Theoretical and Applied Mechanics and Mechanical and Aerospace Engineering
Saltzman, W. Mark, Ph.D., Massachusetts Inst. of Technology/Harvard U. BP Amoco/H. Laurence Fuller Professor, Chemical Engineering
Samorodnitsky, Gennady, D.S., Technion-Israel Inst. of Technology. Prof., Operations Research and Industrial Engineering
Sansalone, Mary J., Ph.D., Cornell U. Prof., Civil and Environmental Engineering
Sass, Stephen L., Ph.D., Northwestern U. Prof., Materials Science and Engineering
Schneider, Fred B., Ph.D., SUNY at Stonybrook. Prof., Computer Science
Schuler, Richard E., Ph.D., Brown U. Prof., Civil and Environmental Engineering/Economics
Schwartz, David, Ph.D., SUNY at Buffalo. Asst. Prof., Computer Science
Selman, Bart, Ph.D., U. of Toronto. Assoc. Prof., Computer Science
Scott, Norman R., Ph.D., Cornell U. Prof., Agricultural and Biological Engineering
Seshadri, Praveen, Ph.D., U. of Wisconsin. Asst. Prof., Computer Science
Seyler, Charles E., Jr., Ph.D., U. of Iowa. Prof., Electrical and Computer Engineering
Shealy, J. Richard, Ph.D., Cornell U. Prof., Electrical and Computer Engineering
Shmoys, David B., Ph.D., U. of California at Berkeley. Prof., Computer Science and Operations Research and Industrial Engineering
Shoemaker, Christine A., Ph.D., U. of Southern California. Prof., Civil and Environmental Engineering
Shuler, Michael L., Ph.D., U. of Minnesota. Samuel B. Eckert Prof. of Chemical Engineering
Silcox, John, Ph.D., Cambridge U. (England). David E. Burr Prof. of Engineering, Applied and Engineering Physics
Sirer, Emin Gun, Ph.D., U. of Washington. Asst. Prof., Computer Science
Speight, Evan, Ph.D., Rice U. Asst. Prof., Electrical and Computer Engineering
Spencer, Michael G., Ph.D., Cornell U. Prof., Electrical and Computer Engineering
Stedinger, Jery R., Ph.D., Harvard U. Prof., Civil and Environmental Engineering
Steen, Paul H., Ph.D., Johns Hopkins U. Prof., Chemical Engineering
Steenhuis, Tammo S., Ph.D., U. of Wisconsin., Prof., Agricultural and Biological Engineering
Stewart, Harry E., Ph.D., U. of Massachusetts at Amherst. Assoc. Prof., Civil and Environmental Engineering
Strogatz, Steven H., Ph.D., Harvard U. Prof., Theoretical and Applied Mechanics
Suzuki, Yuri, Ph.D., Stanford U. Asst. Prof., Materials Science and Engineering
Tang, Chung L., Ph.D., Harvard U. Spencer T. Olin Professor of Engineering, Electrical and Computer Engineering
Tardos, Éva, Ph.D., Eötvös U. (Hungary). Prof., Computer Science and Operations Research and Industrial Engineering
Teitelbaum, R. Tim., Ph.D., Carnegie-Mellon U. Assoc. Prof., Computer Science
Thomas, Robert J., Ph.D., Wayne State U. Prof., Electrical and Computer Engineering
Thompson, Michael O., Ph.D., Cornell U. Assoc. Prof., Materials Science and Engineering
Thorp, James S., Ph.D., Cornell U. Charles N. Mellowes Professor in Engineering, Electrical and Computer Engineering
Tien, Norman C., Ph.D., U. of California at San Diego. Assoc. Prof., Electrical and Computer Engineering
Timmons, Michael B., Ph.D., Cornell U. Lester B. Knight Director of the Knight Laboratory, Prof., Agricultural and Biological Engineering
Tiwari, Sandip, Ph.D., Cornell U. Prof., Electrical and Computer Engineering
Todd, Michael J., Ph.D., Yale U. Leon C. Welch Prof., Operations Research and Industrial Engineering
Tong, Lang, Ph.D., U. of Notre Dame. Assoc. Prof., Electrical and Computer Engineering
Torrance, Kenneth E., Ph.D., U. of Minnesota. Joseph C. Ford Professor, Mechanical and Aerospace Engineering
Trotter, Leslie E., Ph.D., Cornell U. Prof., Operations Research and Industrial Engineering
Turcotte, Donald L., Ph.D., California Inst. of Technology. Maxwell M. Upson Prof. of Engineering, Earth and Atmospheric Sciences
Turnbull, Bruce W., Ph.D., Cornell U. Prof., Operations Research and Industrial Engineering
Turnquist, Mark A., Ph.D., Massachusetts Inst. of Technology. Prof., Civil and Environmental Engineering
Ünlü, Kenan, Ph.D., U. of Michigan. Adj. Prof., Materials Science and Engineering
Valero-Cuevas, Francisco, Ph.D., Stanford U. Asst. Prof., Mechanical and Aerospace Engineering
van der Meulen, Marjolein C. H., Ph.D., Stanford U. Asst. Prof., Mechanical and Aerospace Engineering
Van Loan, Charles F., Ph.D., U. of Michigan. Joseph C. Ford Professor of Engineering, Computer Science
Vavasis, Stephen A., Ph.D., Stanford U. Assoc. Prof., Computer Science
Voelcker, Herbert B., Ph.D., Imperial College of Science and Technology (England). Charles W. Lake Jr. Prof. of Engineering, Mechanical and Aerospace Engineering
vonEicken, Thorsten, Ph.D., U. of California at Berkeley. Asst. Prof., Computer Science
Walker, Larry P., Ph.D., Michigan State U. Prof., Agricultural and Biological Engineering
Walter, Michael F., Ph.D., U. of Wisconsin. Prof., Agricultural and Biological Engineering
Wang, Z. Jane, Ph.D., U. of Chicago. Asst. Prof., Theoretical and Applied Mechanics
Warhaft, Zellman, Ph.D., U. of London (England). Prof., Mechanical and Aerospace Engineering
Webb, Watt W., Sc.D., Massachusetts Inst. of Technology. Samuel B. Eckert Professor of Engineering, Applied and Engineering Physics
Weber-Shirk, Monroe, Ph.D., Cornell U. Lecturer, Civil and Enviornmental Engineering
White, William M., Ph.D., U. of Rhode Island. Prof., Earth and Atmospheric Sciences

Wicker, Stephen B., Ph.D., U. of So. California. Prof., Electrical and Computer Engineering
Wiesner, Ulrich B., Ph.D., U. of Mainz (Germany). Assoc. Prof., Materials Science and Engineering
Wilks, Daniel S., Ph.D., Oregon State U. Prof., Earth and Atmospheric Sciences
Williamson, Charles, Ph.D., Cambridge U. (England). Prof., Mechanical and Aerospace Engineering
Wise, Frank W., Ph.D., Cornell U. Prof., Applied and Engineering Physics
Yona, Golan, Ph.D., Hebrew U. Asst. Prof., Computer Science
Zabaras, Nicholas, Ph.D., Cornell U. Assoc. Prof., Mechnical and Aerospace Engineering
Zabih, Ramin, Ph.D., Stanford U. Assoc. Prof., Computer Science
Zehnder, Alan, Ph.D., California Inst. of Technology. Assoc. Prof., Theoretical and Applied Mechanics and Mechanical and Aerospace Engineering

GRADUATE SCHOOL

Walter Cohen, dean

Alison G. Power, associate dean

Terry D. Plater, associate dean

Sarah S. Hale, assistant dean

Graduate study at Cornell is pursued through the Graduate School, which administers the many graduate fields of study, or through the various graduate professional schools and colleges.

GRADUATE SCHOOL

The graduate program at Cornell permits an unusual degree of accommodation to the needs and interests of the individual student. Degree requirements are kept to a minimum. There are no specific course or credit requirements for the advanced general degrees of Master of Arts, Master of Science, and Doctor of Philosophy, but only such general requirements as best accomplish the aim of graduate study: a period of study in residence, the mastery of one subject, adequate knowledge of allied subjects, oral examinations to establish competency for presentation of a dissertation or thesis, and a satisfactory dissertation or thesis. Certain advanced professional degree programs have specific course or credit requirements that are determined by the faculty of the professional school or college in which the degrees are offered.

A close working relationship between the student and faculty members is essential to the graduate program at Cornell. Under the Special Committee system the student is guided by, and works with, at least two or three faculty members chosen by the student to represent his or her major and minor subjects. The major subject representative is the chair of the Special Committee and usually has the primary responsibility for directing the student's thesis or dissertation research.

REQUIREMENTS FOR ADMISSION

To be admitted to the Graduate School, an applicant should:

1) hold a baccalaureate degree or its equivalent, granted by a faculty or university of recognized standing;
2) have adequate preparation for graduate study in the chosen field of instruction;
3) have fluent command of the English language;
4) present evidence of promise in advanced study and research; and
5) take the Graduate Record Examinations General Test, or other specific examinations, for those fields that require these examinations.

Before admission can be final, all applicants whose native language is not English must provide proof of competency in the English language. Acceptable proof could be

1) a minimum Test of English as a Foreign Language (TOEFL) score of 550 on the paper-based test or 213 on the computer-based test (higher for some fields);
2) evidence of two or more years study in, or a degree from, a college or university in a country where both the language of instruction and the native language is English.

Information on times and places for the TOEFL examination and Graduate Record Examinations and application forms may be obtained from the Educational Testing Service, Princeton, NJ 08541, U.S.A.

Applications for fall admission to the Graduate School should be received by the deadline of the field to which one applies. The earliest deadline is December 1. Many fields, however, have different deadlines. Applicants should consult the Graduate School's application booklet for the specific closing date for each field.

Inquiries regarding admission should be addressed to the specific graduate field office or to the Graduate School Admissions Office, Cornell University, Caldwell Hall, Ithaca, N.Y. 14853–2602.

Inquiries regarding facilities for advanced study and research in a given field, special requirements for such study and research, and opportunities for fellowships and teaching and research assistantships should be addressed to the particular graduate field of interest.

More detailed information is contained in the application for admission to the Graduate School and in the *Graduate School Catalog*. Both may be viewed on the Web at <www.gradschool.cornell.edu/>. An interactive application is available through this site, and application forms may be downloaded and printed directly from the Web. Both the application and the *Catalog* may be received through the mail by contacting either the individual graduate field office or the Graduate School, Caldwell Hall, Cornell University, Ithaca, NY 14853–2602. (The application is mailed world-wide; the *Catalog* is mailed to addresses within the U.S.)

Note: Programs leading to the degrees of Doctor of Law (J.D.), Master of Laws (LL.M.), Doctor of Medicine (M.D.), Doctor of Veterinary Medicine (D.V.M.), and Master of Business Administration (M.B.A.) are not administered by the Graduate School. Information on those programs can be obtained from the Law School, the Weill Medical College of Cornell University (New York City), the College of Veterinary Medicine, and the Johnson Graduate School of Management respectively.

SCHOOL OF HOTEL ADMINISTRATION

ADMINISTRATION

David W. Butler, dean

Leo Renaghan, associate dean for academic affairs

Thomas Cullen, associate dean for industry and international affairs

Cathy A. Enz, executive director, Center for Hospitality Research

Daphne A. Jameson, Richard J. and Monene P. Bradley director for graduate studies

Timothy Hinkin, director of undergraduate studies

Donald C. Bishop, associate dean of students and enrollment management

Margaret Haley Ferguson, director of financial services

James E. Hisle, managing director of the Statler Hotel and J. Willard Marriott Executive Education Center

Cheryl S. Farrell, director of admissions and student services

Neoma Mullens, director of multicultural programs

Katherine S. Margolis, director of library

Philippus Miller III, director of alumni affairs

Timothy J. Durnford, director of instructional support

Millie Reed, director of career services

Glenn Withiam, director of publications

Fred Conner, senior editor of the *Cornell Hotel and Restaurant Administration Quarterly*

Mark Adams, director of communications

DEGREE PROGRAMS

	Degree
Hotel and Restaurant Administration	B.S. M.M.H. M.S. Ph.D.

FACILITIES

Statler Hall. Statler Hall is a unique building designed expressly to meet the needs of the faculty and students of the School of Hotel Administration. The building serves both practical and theoretical instruction, houses classrooms, lecture rooms, laboratories, a library, a computer center, a beverage-management center, an auditorium, and the Statler Hotel and J. Willard Marriott Executive Education Center. Statler Hall and the Statler Hotel were designed expressly for the school's academic and executive-education programs, providing students with training and work experience in facilities similar to those in which they will work after graduation.

The School of Hotel Administration's Nestlé Library has the largest single collection of hospitality-related materials in the United States. The collection contains approximately 23,000 books, 1,000 videotapes, numerous ephemera and memorabilia (such as photographs, menus, and rare books), and more than 800 journal, magazine, newsletter, and newspaper subscriptions. Materials on lodging, foodservice, travel and tourism, and general business topics comprise the core of the library's collections. Among the library's special features are numerous computerized information resources, including *NEXIS, Dow Jones, ABI/INFORM,* and *The International Hospitality and Tourism Database,* an extensive and unique index to hospitality articles. Information resources and services for the hospitality industry are available for a fee through the library's HOSTLINE service. In addition to offering an excellent collection of materials and a dignified and refined study space, the Hotel School library extends quality service to every student.

Statler Hotel and J. Willard Marriott Executive Education Center. The Statler Hotel comprises 150 guest rooms, an executive education center, restaurants, a lounge, and the university's faculty and staff club. It demonstrates the very finest in hospitality and hospitality-education practices. The Statler is an independent, self-sustaining teaching hotel that provides quality food, beverage, meeting, and lodging services to the local community and campus visitors, including parents and those who visit Cornell as part of the application process. In addition, the hotel is a practice-management facility for certain classes, internships, and independent-study projects. It offers part-time jobs to approximately 300 students each semester with preference given to students in the hotel school.

UNDERGRADUATE CURRICULUM

The School of Hotel Administration offers education in the numerous disciplines required for modern management in the global hospitality industry. Included in the core curriculum are courses in management, human resources, financial management, food and beverage operations, marketing, tourism, property asset management, communications, and law. Students also are encouraged to pursue a broad range of elective courses, including those in the humanities, social sciences, and natural sciences, as preparation for assuming leadership positions in the business and local community. For more complete information about undergraduate program requirements, see the school's student handbook or course supplement (available in room 174 Statler Hall).

Requirements for Graduation

Regularly enrolled undergraduate students in the School of Hotel Administration are candidates for the degree of Bachelor of Science. The requirements for that degree are:

1) completion of eight terms in residence for those who entered as freshmen; terms of residence for transfer students are determined by the amount of transfer credit awarded;
2) completion, with a minimum cumulative grade-point average of 2.0 (including a grade-point average of 2.0 in a full-time schedule of courses on campus in the final semester), of 120 required and elective credits, as set forth in the table on the following page;
3) qualification in one language other than English. This requirement may be met by any one of the following: (1) three years of high school study of one foreign language; (2) score of 560 on Cornell Placement Test; (3) pass language 121 and 122 (eight credits) or the equivalent, and attain a minimum grade of at least C- or "Satisfactory" in each (C or above for transfer credit from other institutions); or (4) pass 123 or the equivalent;
4) completion of two units of practice credit prior to the last two terms of residence, as defined on the following page;
5) completion of the university requirement in physical education.

Suggested course programs appear on the following pages. The core courses account for 72 of the 120 credits needed for graduation, the hotel electives account for 12 credits, and 18 credits are allotted for distributive electives. The remaining 18 credits may be earned in courses chosen from the offerings of any college of the university, provided that the customary requirements for admission to such courses are met.

Students in the School of Hotel Administration who plan to attend summer school at Cornell or any other four-year college or university, with the expectation that the credit earned will be counted toward the Cornell degree in hotel administration, must obtain the approval of the school in advance. Without advance approval, such credit may not count toward the degree.

Credit earned in military science, aerospace studies, or naval-science courses may be counted in the 18-credit group of free electives. No credit toward the degree is allowed for "0"-level courses, such as Educ 005.

Transfer Credit Policy

Transfer students are required to complete all degree requirements with at least 75 credits at Cornell University, of which a minimum of 60 must be in courses offered by the Hotel School, and nine must be in distributive electives taken outside the Hotel School. Thus, a maximum of 45 hours in transfer credit may be allowed from other accredited colleges or universities as follows:

Core	18
Hotel Electives	0
Distributive Electives	9
Free Electives	18
	45

In the core, transfer credit may be allowed against basic courses only (for example, HA 121, HA 136, Economics). Others generally are waived, and an upper-level course in the area substituted. For instance, if HA 243 were waived, another marketing course would be required in its place. The communication courses (HA 165 and HA 365) are tailored specifically to the School of Hotel Administration, and, thus, communication courses taken elsewhere generally are not accepted against core courses.

Hotel elective courses may not transfer.

Distributive electives ensure that Hotel students are exposed to other courses at Cornell, and, thus, only nine credits may transfer. The remaining nine must be taken at Cornell but may be distributed in any combination of humanities, social sciences, or natural sciences provided at least three credits are taken (at Cornell or transferred from elsewhere) in each area. A maximum of six credits, but no more than four per semester, of distributive electives may be taken on an S-U basis. For more information on the distribution requirement, see the handout available in the student services office, room 178 Statler Hall.

Eighteen credits in free electives may transfer.

Concentration

While completing the hotel elective courses, undergraduates in the school may select a concentration.

When students select a field of concentration, they should consult the coordinator of instruction in that area during the sophomore year to plan the sequence of courses that will best fit their program.

Upon completion, the concentration will be noted on the transcript, provided a cumulative GPA of 3.0 in the concentration was attained.

Foreign Languages

Mastery of a foreign language is particularly desirable for students who are planning careers in the hospitality industry and, hence, the second language requirement for graduation. Further information on foreign language courses at Cornell, and placement in language courses, may be found in this book in the College of Arts and Sciences program description under the Modern Languages, Literature, and Linguistics section, and also under the section Advanced Placement for Freshmen.

Independent Study

Students may conduct independent study projects in any academic area of the school under the direction of a resident faculty member. Credit is arranged on an individual basis. To enroll in an independent study project, students must obtain written permission from the school before the add deadline. See H ADM 499 or 699 for more details.

Practice-Credit Requirement

As part of the degree requirements, undergraduates enrolled in the School of Hotel Administration must fulfill the practice-credit requirement and submit verification thereof prior to registering for the last two semesters. Further details are set forth in the *Practice Credit Handbook for Undergraduates in the School of Hotel Administration,* available in the school's Career Services Office, room 255 Statler Hall.

Management-Intern Program

Hotel School juniors and seniors have a unique opportunity to gain invaluable knowledge and experience in the hospitality industry through the management–intern program. Students receive 12 free elective credits and 1 practice credit. While on the internship, tuition is reduced and students receive a salary from the sponsoring organization. Positions are available in the United States and internationally. Sponsors include, but are not limited to, hotels, restaurants, casinos, corporate offices, consulting firms, and clubs. Application should be made one semester in advance. Information meetings are held at the beginning of each semester and are open to all students. See H ADM 493 and 494 for more details. More information about the management intern program also is available in the Career Services Office, 255 Statler Hall.

Study Abroad

All students planning to study abroad apply through Cornell Abroad; please see the Cornell Abroad program description in the introductory section of *Courses of Study.*

Programs providing an opportunity to study in a foreign country and develop an awareness of the international component of the hospitality industry can contribute to each student's total educational experience. Students in recent years have studied in Italy, Spain, France, England, Australia, and many other countries. Information on the study-abroad programs operating during the summer and academic year is available at the Cornell Abroad Office (in Uris Hall).

Students should discuss their plans with the school's director of student services so that all petition and credit-evaluation procedures are followed.

Part-Time Study

Generally, part-time study is not allowed. Exceptions may be made for employee degree candidates, students who have medical reasons for a reduced schedule, or other extenuating circumstances. In no event shall a student be allowed to enroll on a part-time basis during the last term of study. Further details on part-time study may be found in the school's student handbook (available in room 174 Statler Hall).

Grading System

Letter grades ranging from A+ to F are given to indicate academic performance in each course. These letter grades are assigned a numerical value for each term average as follows: A is equivalent to 4.0; B to 3.0; C to 2.0; D to 1.0; F to 0. For good standing, the student must maintain a minimum average of 2.0. A maximum of four credits each term may be taken on a "satisfactory-unsatisfactory" (S-U) basis. Students should be aware that a satisfactory grade equals "C-" or above and an unsatisfactory grade equals "D+" or lower.

Students whose term averages are at least 3.3 and who took at least 12 credits of letter grades with no unsatisfactory or incomplete grades are honored by being placed on the Dean's List.

Course Requirements for Graduation

Required courses	*Credits*
Management Operation: Hotel Administration 105, 401	6
Human-Resources Management: Hotel Administration 115, 211	6
Financial Management: Hotel Administration 121, 221, 222, 321	12
Food and Beverage Management: Hotel Administration 136, 236, 335	12
Marketing and Tourism: Hotel Administration 243, elective	6
Property Asset Management: Hotel Administration 255, 355	6
Communication: Hotel Administration 165, 365	6
Operations Management and Information Technology: Hotel Administration 174, 371, 475	9
Law: Hotel Administration 387	3
Economics: Micro and Macro	6
Specifically required credits	72
Hotel Electives	12
Distributive electives	18
Free electives	18
Total credits required for graduation	120

Typical Course Sequences

The following arrangements of courses tend to be more fixed in the freshman and sophomore years, with a greater degree of flexibility characterizing the upperclass years.

Freshman Year

Typically, a freshman schedule will consist of 15 to 16 credits each term, to include the following:

Required courses	*Credits*
H ADM 105, Introduction to Lodging	3
H ADM 115, Organizational Behavior and Interpersonal Skills	3
H ADM 121, Financial Accounting	3
H ADM 136, Introduction to Food Service Operations	4
H ADM 165, Managerial Communication I	3
H ADM 174, Microcomputing	3
H ADM 191, Microeconomics for the Service Industries	3
Macroeconomics	3
Electives	6
	31

Sophomore Year

Required courses	*Credits*
H ADM 211, Human Resources Management	3
H ADM 221, Managerial Accounting	3
H ADM 222, Finance	3
H ADM 236, Culinary Theory and Practice	4
H ADM 243, Principles of Marketing	3
H ADM 255, Hotel Development and Planning	3
Electives	12
	31

Junior Year

Required courses	*Credits*
H ADM 321, Hospitality Financial Management	3
H ADM 335, Restaurant Management	4
H ADM 355, Hospitality Facilities Operations	3
H ADM 365, Managerial Communication II	3
H ADM 371, Hospitality Quantitative Analysis	3
H ADM 387, Business and Hospitality Law	3
Electives	12
	31

Senior Year

Required courses	*Credits*
H ADM 401, Strategic Management	3
H ADM 475, Information Technology in the Hospitality Industry	3
Marketing Elective	3
Electives	18
	27

GRADUATE CURRICULUM

The school's programs for advanced degrees include those of Master of Management in Hospitality, Master of Science, and Doctor of Philosophy. For further information on graduate programs, consult the school's graduate catalog (available in room 172 Statler Hall); contact the school's graduate services office at 255–7245, or see the university's *Announcement* from the Graduate School.

Required Program for Professional Master's Students

Required courses	*Credit*
H ADM 701, Competitive Strategies for the Hospitality Industry	3
H ADM 702, Human Behavior in Organizations	3
H ADM 711, Human Resources Management	3
H ADM 721, Financial Economics	3
H ADM 722, Hospitality Financial Management	3
H ADM 731, Food and Beverage Management	3
H ADM 741, Marketing Management	3
H ADM 751, Properties Development and Planning	3
H ADM 761, MMH Managerial Communication	0
H ADM 771, Quantitative Methods	3
H ADM 772, Information Technology for Hospitality Managers	3
H ADM 791, Creating and Managing for Service Excellence	3
H ADM 793, Industry Mentorship Program	0
H ADM 794, Management Development Component I and II	0

Balance of courses are electives.

Total credits required for the Master of Management in Hospitality program **64**

Course Schedule Information

For up-to-date information about course scheduling, and to obtain a course supplement, contact the hotel school student services office in room 178 Statler Hall, telephone 255-3076.

MANAGEMENT OPERATION COURSES

[H ADM 100 Principles of Management
Fall and spring. 3 credits. Limited to non-hotel students. Elective. Not offered fall 2001. K. Namasivayam.
An introductory survey course in management with orientation to the hospitality industry. The course is organized around the traditional management functions of planning, organizing, commanding, coordinating, and controlling.]

H ADM 102 Distinguished Management Lectures
Fall. 1 credit. Elective. D. Butler.
The Dean's Distinguished Lecture Series is a long-standing Hotel School tradition that provides a unique opportunity for successful industry leaders to share their experiences with Cornell students. In its 40-year history, the Dean's Distinguished Lecture Series has hosted the most influential and accomplished leaders from every segment of the hospitality industry. Speakers share their views about successful management styles, possible career paths, critical industry-related issues, and qualities conducive to successful business leadership. Students have an unparalleled opportunity to learn and question how hospitality leaders view the current and future status of the industry.

H ADM 105 Introduction to Lodging
Fall and spring. 3 credits. Limited to hotel and sponsored internal transfer division students. Required. R. McCarthy.
Designed to provide students with a comprehensive, fundamental understanding of how hotels are managed from the rooms perspective. Through practical hands-on experiences, students will be exposed to operational line-level positions in the rooms division including housekeeping, reservations, front desk, PBX, and bellstand. Lectures will begin with an overview of the lodging industry and will focus on the managerial aspects of the rooms division. Topics include revenue management, forecasting, budgeting, measuring performance, transient versus group displacement, pricing and inventory management, service quality, ethics, and technology. Students will apply what they have learned in class while operating their own virtual 250-room hotel using a CHESS computer simulation. Guest lecturers will provide students with insight on various career opportunities in the operations or rooms-related areas.

H ADM 303 Club Management
Fall and spring. Fall, second 7 weeks only; spring, first 7 weeks only. 2 credits. Fall, limited to 35 hotel school juniors and seniors; spring, open enrollment. Prerequisite for hotel students: H ADM 105, or equivalent. Elective. R. James.
The study of private membership clubs and club administration. The application of current management principles in a not-for-profit environment is discussed and club management is compared to other areas of the hospitality industry. Topical coverage includes: tournament, facility, and recreation management; legal, financial, and legislative issues; human relations and resource consideration; marketing, pricing policies, and quality standards. The deadline to drop is the mid-point of the course.

H ADM 306 Franchising in the Hospitality Industry
Fall. 3 credits. Not open to freshmen. Elective. M. Noden.
This course looks at relationships between franchisor and franchisee, advantages and disadvantages of franchising, and structure and services offered by franchisors. Case studies of leading lodging and restaurant companies currently offering franchises will be discussed. Guest speakers from the franchising industry.

H ADM 401 Strategic Management
Fall and spring. 3 credits. Prerequisites: H ADM 105, 115, 211, and 321, or equivalents. Required. R. Chase, T. Cullen, C. Enz.
This is a senior management, broadly based and encompassing course. It will incorporate almost all functional areas including, marketing, human resources, finance, rooms operation, accounting, economics, and asset management. The issues of strategic management necessitate total enterprise and competitive perspectives. Strategic skills involve judging how relevant factors affect the business organization. The course will introduce a number of models, methods, and techniques used to develop strategic thought, to generate action plans, and to assess changes. These introductions and the course project will stress the need for continuous review of environmental opportunities to maximize the well being of all stakeholders. Because of the group nature of the course, the absolute drop deadlines are September 7 in the fall and January 25 in the spring.

H ADM 402 Hospitality Management Seminar
Fall. 1 credit. Limited to 30 seniors and graduate students by permission. Students will be expected to register for H ADM 102. Elective. D. Butler.
This course complements H Adm 102 by providing students an opportunity to personally interact with guest speakers, and to actively participate in roundtable discussion

on issues relating to the hospitality industry. The open dialogue provides students with a better understanding of industry trends, challenges, and opportunities.

H ADM 403 Resort and Condominium Management
Fall. Students may enroll in first seven weeks, second seven weeks, or both. 2 credits. Limited to seniors and graduate students, others by permission of instructor. Mandatory attendance in all class periods. Elective. M. Noden.

First Seven Weeks: Resort Management: A lecture course in the development, operations, and management of the resort property. Resorts of various types, seasons, and economic levels are considered. Emphasis is on the financing and environmental considerations of the resort development cycle. Regulatory issues are examined, and relationships with host communities and governmental bodies are explored. Special consideration is given to the promotion of business, the provision of facilities, services and guest entertainment. Contract and noncontract relationships with the travel industry are reviewed.

Second Seven Weeks: Resort Condominium Management: A lecture course in the development, financing, and management of secondary-residential hotel condominiums. Contemporary state statutory requirements, S.E.C. regulations and prospectus rules are reviewed for application in the managerial portfolio. Federal land use controls are examined and explained. Individual financing of units, and management contracts are fully reviewed, and students will be exposed to typical management contract requirements and protocols. Rental pooling and its effects upon management and owners will be fully explored. Applications of the condominium concept, including such by-products as time sharing, will be examined from a managerial perspective.

H ADM 404 Entrepreneurship
Fall and spring. 3 credits. Limited to 40 juniors, seniors, and graduate students. Prerequisite: H ADM 321 or equivalent. Elective. Not offered fall 2001. Faculty.
Emphasizes starting a new business, not franchising or buying an existing business. Topics will cover how to conceptualize an idea, how to evaluate and articulate the plan, and how to sell the plan to investors, customers, partners, and employees. Students work in teams to develop and present a business plan to a panel of judges at the end of the course. Case studies, guest lecturers. **Because of the group project nature of the course, the absolute drop deadline for all students is the last day of the first week of classes.**

H ADM 405 Quality Planning in the Hospitality Industry
Spring. 3 credits. Limited to 25 seniors and graduate students. Prerequisites: all required hotel undergraduate courses at the 100, 200, and 300 levels. Elective. T. Hinkin.
Focuses on the analysis of work processes and examines organizations from three perspectives: the customer, the employee, and management. Provides students with a systematic approach to identifying, prioritizing, and improving key job functions and work processes utilizing the tools of quality management. Readings, case analysis.

H ADM 407 Seminar in Hotel Operations
Spring. 3 credits. Limited to 25 juniors and seniors with permission of instructor. Estimated cost of field trip, $200. Elective. R. McCarthy.
Seminar course applies management theory to actual hotel operations via semester-long interactions and visits with the department heads and general manager of a medium- to large-size hotel. Field trip includes attendance at executive committee meeting, presentations by various department heads, and half-day "shadow assignments."

H ADM 408 Seminar in Casino Operations
Fall. 2 credits. Limited to hotel juniors and seniors. Estimated cost of field trip, $200. Elective. R. McCarthy.
A vital part of the hospitality industry, casino gaming is one of the most exciting and fastest growing industries. This course focuses primarily on the operation and ownership of commercial casinos and the hotels attached to them. The course is designed to introduce students to the internal and external casino environment. The historical development of gaming in America to understand how the industry has evolved to its present form will be examined. By the end of the course students will understand the organizational structure of a casino hotel, how it operates and how it makes money. Students will also gain an understanding of the different companies that own casino hotels and the current issues facing these companies. Casino marketing strategies, player rating systems, the social and economic impact of gaming and the various regulatory environments within which casinos operate will be examined. Students will learn how common casino games are played, and come to understand the mathematics of the various games. Students will build on their food and beverage and hotel knowledge to better understand the specific challenges facing casino hotel operators.

[H ADM 409 Airline Management
Spring. 3 credits. Elective. Offered alternate years. Next offered 2003, 2005. M. Noden.
Focuses on domestic and international airline industries and explores both pre- and post-regulatory climates. Emphasis is on dynamic organizational change in response to fluctuating economic and legal conditions. Topics include airline organization, comparative corporate strategies, marketing and distribution networks, operations and service management, union relations, finance, government regulation, and air transport. Case studies and guest lecturers will be used. Also, using the computer-driven simulation exercise called AIRLINE, student teams will operate a small regional carrier.]

H ADM 603 Managing Across Cultural Boundaries
Spring. 3 credits. First seven weeks of the semester. Limited to seniors with H ADM 121, 165, 321, 401, or graduate student status. The deadline to drop is the midpoint of the course. Elective. J. Katz.
Contributes to the development of knowledge and skills needed to manage effectively in other cultures. Objectives are to develop awareness of the pervasive and hidden influence of culture on behavior, particularly with respect to management and management practices; to develop familiarity with the types of situations and issues that often confront managers working in foreign countries; and to develop an appreciation of the impact on personal behavior of living and working in another culture. Readings, case studies.

H ADM 701 Competitive Strategies for the Hospitality Industry
Fall. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of pre-enrollment. T. Cullen.
An integration and application of management concepts, theories, and practices to business situations. Students analyze current problems, formulate strategies, and implement policies.

H ADM 702 Human Behavior in Organizations
Fall. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of pre-enrollment. T. Hinkin.
Focuses on manager and member behavior in organizations. Ideas and models about persons, interpersonal relationships, small groups, and organizations will provide the basis for understanding the dynamics of effective organizational behavior. Learning will occur primarily through readings, case discussions, and self-reflective teamwork.

[H ADM 801 Seminar in Hospitality and Service Inquiry
Fall. 3 credits. Elective. Offered alternate years. Next offered 2002, 2004. C. Lundberg.
This seminar introduces academic graduate students to the major alternative ways of conceptualizing and designing research, and acquiring, interpreting, and disseminating findings. The implications and consequences of one's choices and tradeoffs among the alternative philosophical, ideological, and pragmatic perspectives and approaches to inquiry will be emphasized.]

HUMAN RESOURCES MANAGEMENT

H ADM 115 Organizational Behavior and Interpersonal Skills
Fall and spring. 3 credits. Required. C. Lundberg, K. Walsh.
Focuses on managing people in the workplace. Students develop theoretic lenses for understanding people and organizations and practical tools for accomplishing personal and organizational goals. Topics include individual differences, conflict management, problem solving, power and influence, motivation, leadership, coaching and counseling, and group process. Self-assessments, experiential exercises, reading, discussions, papers, and group activities.

H ADM 210 The Management of Human Resources
Fall and spring. 3 credits. Limited to 40 non–hotel students, no freshmen. Elective. Not offered fall 2001. Faculty.
Examines the role of human resources management, starting with an introduction to the personnel function and an analysis of the social, legal, international, and competitive factors. Examines recruitment, selection, training, motivation, development, compensation, performance appraisal, and labor relations. Class discussion and case analysis are emphasized.

H ADM 211 Human Resources Management
Fall and spring. 3 credits. Limited to 60 hotel students per lecture, no freshmen or graduate students. Prerequisites: H ADM 105 and 115 (co-registration in 115 allowed). Required. M. Sturman, B. Tracey.
Provides students with an overview of the human resources management (HRM) field and shows them the link between specific HRM activities and substantive issues/situations they will face as future hospitality managers. Integrates information and knowledge acquired in previous courses. Students will understand the relationship between compensation and benefit activities and job design, motivation, and reward structures. Upon completion, students will (1) understand the interrelationship of HRM activities, as well as the relationship between HRM and other functional areas within hospitality organizations; and (2) understand how to effectively attract, retain, and motivate hospitality employees.

H ADM 313 Training in the Hospitality Industry
Fall. 3 credits. Limited to 24 students. Prerequisite: H ADM 211. Estimated cost of field trip, $200. Elective. B. Tracy.
Training is one of the primary activities for coping with a continuously changing environment. It is also one of the fundamental responsibilities of all hospitality managers. In this course, students learn the major theoretical and practical issues associated with program design, development, implementation, and evaluation. In addition, students apply their knowledge in a semester-long project with one or more hospitality organizations.

H ADM 411 Negotiations in the Hospitality Industry
Spring. 3 credits. Limited to 30 undergraduate students. Prerequisites: H ADM 115, or equivalent. Elective. T. Simons.
Negotiation skills are crucial to business success. This course provides hands-on experience in negotiation in the hospitality field. Writing, role-playing exercises, and discussions are used to develop students' negotiation skills. Students will improve their comfort level with negotiating as well as develop their own personal style. Students will also learn how to adjust their negotiating style to respond appropriately to different personalities and negotiation tactics.

H ADM 412 Managing Organizational Change
Spring. 3 credits. Prerequisite: H ADM 211 or equivalent. Elective. C. Lundberg.
Facilitating and managing change in organizations. Topics include change processes, organizational diagnosis, action planning, and consultancy. Individual and team projects.

H ADM 415 Managerial Leadership in the 21st Century
Spring. 1 credit. Weekend course. Dates TBA. Elective. Required notebook $25. K. Blanchard.
Students become participant observers in their own lives by studying the field of applied behavioral science. Students will be able to use what they learn about human beings and how they function best in groups and organizations on a day-to-day basis to develop quality relationships between themselves and the people they support and depend upon (boss, staff, internal peers/associates, and customers). **Because of the popularity of this class, priority will be given in the following order: seniors, juniors, non-employee extramural students, sophomores, freshmen, and Cornell employees. The absolute deadline for adding or dropping the course is 12:00 noon on the first day of class.**

H ADM 416 Special Studies in the Management of Human Resources: Service Cultures
Spring. 2 credits. Limited to juniors, seniors, and graduate students. Prerequisite: H ADM 211 or equivalent. Elective. C. Lundberg.
First Seven Weeks—Service Cultures. This course will assist students in understanding the creation and maintenance of effective service-driven operations. Emphasis will be placed on the diagnosis and design of human resource initiatives aimed at creating effective service cultures and improving organizational performance. Topics covered include the management of emotions, monitoring and measuring the corporate culture for service, and the linkage of human resource practices to service vision, organizational design, and strategic objectives. Students will develop and conduct a culture audit in a business. The seminar format is intended to encourage class discussion, case analysis, and field experience.

Second Seven Weeks—Service Organization Design. Since the earliest organizations, questions of how to best organize activities and resources have challenged managers. Traditional structures, e.g., those organized by functions, products, territories, seem to work less effectively as time goes on. The contemporary management challenge is to design and use more responsive, and flexible organizations—especially in the service sector. It is important to understand the effects of different organizational designs and systems on behavior and efficiency. This course will therefore carefully explore the components, processes, and issues associated with known and probable design options. We will operate as a seminar with several application classes.

H ADM 418 Innovation and Dynamic Management (also ARME 328)
Spring. 3 credits. Limited to juniors and seniors. Elective. C. Enz.
A university-wide course that investigates the innovation process and how to develop good management practice. Innovative firms are studied via case analyses, and a framework for effective change management is devised by the end of the semester. Emphasis is placed on examining how businesses and managers can build profitable organizations through a process of rethinking, re-evaluating, and discarding existing practices. The class will operate as a seminar with several hands-on experiences in innovation.

H ADM 611 Negotiations in the Hospitality Industry
Spring. 3 credits. Limited to 30 graduate students. Prerequisite: H ADM 702 or equivalent. Elective. T. Simons.
Negotiation skills are crucial to business success. This course provides hands-on experience in negotiation in the hospitality field. Writing, role-playing exercises, and discussions are used to develop students negotiation skills. Students will improve their comfort level with negotiating as well as develop their own personal style. Students will also learn how to adjust their negotiating style to respond appropriately to different personalities and negotiation tactics.

H ADM 614 Leadership and Small Group Processes
Fall. 3 credits. Limited to 30 hotel seniors and graduate students. Elective. T. Simons.
Theoretical and practical applications of organizational behavior will be explored through lectures, case studies, and management games and exercises. Students will participate in experiential labs aimed at enhancing their effectiveness as members or leaders of groups. Topics include leadership, decision making, motivation, power, and organizational change.

H ADM 711 Human Resources Management
Spring. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of pre-enrollment. B. Tracey.
Addresses the policies and procedures that are required to attract, develop, and retain quality employees. Attention will be given to both strategies and tactics that influence HR decisions, as well as individual and organizational performance. A variety of learning methodologies will be used and students will have the opportunity to apply knowledge and skills in a semester-long project.

FINANCIAL MANAGEMENT

H ADM 120 Personal Financial Planning
Fall. 2 credits. Limited to non-hotel students. Elective. L. Hensley.
An overview of personal financial planning including money management, tax planning, use of credit, insurance, investing, retirement, and estate planning.

H ADM 121 Financial Accounting
Fall and spring. 3 credits. Limited to hotel students. Required. D. Dittman.
The basic principles of accounting, involving transaction analysis, flow of accounting data to the financial statements, and careful consideration of accounting for revenues, expenses, assets, liabilities, and owner's equity.

H ADM 123 Financial Accounting Principles
Fall and spring. 3 credits. Limited to non–hotel students. Elective. P. Sinha.
An in-depth introduction to the principles of financial accounting, involving transaction analysis, flow of accounting data to the financial statements, and careful consideration of accounting for revenues, expenses, assets, liabilities, and owner's equity.

H ADM 125 Finance
Fall and spring. 3 credits. Limited to non-hotel students. Elective. L. Canina.
This course examines in depth corporate finance topics including time value of money, risk and return, valuation models, cost of capital, capital budgeting, capital structure, and dividend policy.

H ADM 221 Managerial Accounting
Fall. 3 credits. Prerequisites: H ADM 121 and 174, or equivalents. Required. G. Potter.
The focus of this course is on the use of accounting information for management decision making and control. Topics include

product costing, management control systems, and performance measurement. There will be one common exam at the end of the semester.

H ADM 222 Finance
Spring. 3 credits. Prerequisite: H ADM 121, 221, or equivalents. Required. S. Carvell.
Provides students with accounting cash flow information for financial planning, capital structure decisions, capital budgeting evaluation, and short-term and long-term financial decision making. Topics include current asset management, short-term financing, capital budgeting, long-term financing, cost of capital, and problems in international finance.

H ADM 321 Hospitality Financial Management
Fall. 3 credits. Prerequisites: H ADM 121, 221, and 222, or permission of instructor. Required. N. Geller.
Integrates the areas of financial accounting, managerial accounting, and finance and applies the interpretive and analytical skills of each to hospitality-industry situations. Topics include uniform system of accounts, revenue and expense tracking and internal control, accounting systems, ratio and comparative analysis, cost-volume-profit analysis, pricing, operational budgeting, project capital budgeting, decision making, equity and debt financing structures, and operating agreement forms.

H ADM 322 Principles of Investment Management
Fall and spring. Limited to non-hotel students. Hotel students or those with a background in economics, quantitative analysis, and computers are advised to enroll in H ADM 424. Elective. C. Gadarowski.
An introductory course covering institutional and analytical aspects of security analysis and investment portfolio management including valuation models and practical strategies for stocks, bonds, and mutual fund selection and trading. Computer-assisted analysis, including students' participation in an investment game, is discussed and applied in a realistic manner.

H ADM 323 Hospitality Real-Estate Finance
Spring. 3 credits. Limited to juniors and seniors. Prerequisite: H ADM 321 or equivalent. Elective. J. deRoos, D. Quan.
Focuses on real estate financing for hospitality-oriented projects. Topics include methods of measuring rates of return; feasibility and appraisal processes; equity and debt financing vehicles to include joint ventures, limited partnerships, construction mortgages, participating, convertible, and seller-financed mortgages; forms of operating agreements to include management contracts, leases, and franchises; and trends in international hotel franchising. Presentations by hospitality industry real estate practitioners will be made.

H ADM 324 International Financial Management
Fall and spring. 3 credits. Prerequisites: H ADM 121, 221, 222, or equivalents, and micro and macroeconomics. Elective. D. Ferguson.
Focuses on the international aspects of financial management important to the hospitality industry with the intention of providing an understanding of and confidence in dealing with the economic issues faced by the multinational corporation. Areas covered are the international financial management environment, the management of foreign exchange risk, international asset management, and international sources of funds.

H ADM 326 Corporate Finance
Fall. 3 credits. Limited to juniors and seniors. Prerequisite: H ADM 321. Elective. S. Carvell.
In-depth analysis of corporate financial management, including financing alternatives and capital structure decisions, cash management, capital budgeting decisions, risk analysis, and working capital management. Although applicable to all businesses, special attention is placed on issues important to the hospitality industry. Emphasizes analytical methods through case studies and an in-depth semester project.

H ADM 421 Internal Control in Hospitality Operations
Spring. 3 credits. Limited to 30 students. Prerequisite: H ADM 321, 722, or equivalents. Elective. N. Geller.
Hotel and restaurant operations are analyzed from the perspective of preventing fraud and embezzlement. The design and distribution of production, accounting, information systems, and supervisory tasks are studied in a manner that will ensure effective internal control and verifiable audit trails. Case studies.

H ADM 422 Taxation and Management Decisions
Fall. 3 credits. Limited to 50 juniors, seniors, and graduate students. Elective. A. Sciarabba.
Introduction to tax advantages and disadvantages of various organizational structures, including corporations, partnerships, and subchapter "S" corporations; financial information reporting to tax authorities and shareholders and how they differ; use of depreciation methods to achieve tax reductions; syndication techniques; and the role tax laws play in promoting private investments and development.

H ADM 423 Financial Management Policy
Fall and spring. 3 credits. Limited to 30 students; non-hotel students by permission of instructor. Prerequisite: H ADM 326 or 721. Elective. S. Gibson.
Covers numerous policy issues in financial management. Each of these issues will affect the potential profitability and survivability of the firm under conditions of uncertainty. The course will concentrate on nine major policy issues including capital structure, dividend policy, lease vs. buy analysis, and working capital financing.

H ADM 424 Security Analysis and Portfolio Management
Fall. 3 credits. Limited to juniors, seniors, and graduate students. Prerequisites: macro and micro economics, introductory course in statistics and/or quantitative analysis, and knowledge of computers beyond word processing. Elective. C. Gadarowski.
An in-depth analysis of financial instruments, investments and portfolio management including fixed income, equity securities, advanced valuation models, risk-return analysis, screening techniques, asset allocation, and active portfolio management and trading. Recent developments in investments research are covered, and large financial databases are used for practical applications of the concepts and techniques presented.

H ADM 525 Securitization and Structured Financial Products
Fall. 3 credits. Limited to seniors and graduate students. Prerequisites: H ADM 222 or 721 and 424, or by permission. Elective. D. Quan.
Deals with the structure and analysis of securitized financial products with an emphasis on residential and commercial mortgage-backed securities (MBS). Intended for those who wish to acquire a working knowledge in the analysis of such securities (such as collateralized securities) and a deep understanding of the securitization process. Necessitates a highly analytic and quantitative approach. Students are required to have a strong background in finance and economics.

H ADM 528 Advanced Topics in Real Estate and Finance
Spring. First seven weeks. 2 credits. Limited to 20 seniors and graduate students or permission of the instructor. Prerequisite: H ADM 323, H ADM 458, or H ADM 621. Elective. D. Quan.
This is an intense seven-week course which takes an analytically oriented approach to understanding advanced real estate finance topics. It is intended for students who are highly motivated to learn advanced techniques and are not afraid of mathematical rigor. The course emphasizes the use of financial and economic principles and makes extensive use of statistics and mathematics. Students are required to have a solid background in the basics of finance, microeconomics, and macroeconomics. Note: the deadline to drop a seven-week course is the mid-point of the course.

H ADM 621 Hospitality Real Estate Finance
Spring. 3 credits. Limited to graduate students. Prerequisite: H ADM 722 or equivalent. Elective. J. deRoos.
For description, see H ADM 323. This graduate course includes the H ADM 323 lectures plus an hour-long discussion session each week which features guest speakers from industry, faculty from other colleges, and case studies.

H ADM 622 Capital Investment Analysis
Spring. 3 credits. Prerequisite(s): a course in principles of corporate finance (for graduate students, HA 721 or its equivalent; for undergraduate students, HA 222 and permission). Elective. S. Carvell.
This course is about how financial managers must make capital investment decisions in order to maximize shareholder wealth. This requires an in-depth understanding of both the investing and financing decision-making process. To understand the former, students learn about the capital budgeting process and acquire specific skills enabling them to evaluate capital projects; e.g., net present value, discounted cash flow and risk analysis. For the latter, students learn how equity and debt securities are priced in a dynamic capital market and how the firm's capital cost and structure are linked with shareholder wealth maximization. Cases are used to illustrate theory and industry guest speakers conduct occasional seminars.

H ADM 624 Reporting and Analysis for Financial Statements
Fall and spring. 3 credits. Limited to 30 seniors and graduate students. Elective. P. Sinha.

This course is designed to provide understanding of the basic accounting model, the underlying concepts for income measurement, and the accounting rules for the valuation of assets, liabilities and owners' equity. Emphasis will be placed on understanding the economic substance of the transactions and the implication of using alternate accounting rules on the resulting numbers, especially in assessing the "earnings quality." Focus is placed on an outsider's view of the company, and the students should be able to evaluate and interpret the published financial information, specifically in the context of valuation, debt and compensation contracts, and credit assessment.

H ADM 721 Financial Economics
Fall. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of preenrollment. L. Canina.

Integrates corporate finance with the framework of value maximization and the competitive analysis of product and factor markets in the hospitality industry. Topics include short-term asset management, strategic valuation, capital budgeting analysis, capital structure decisions, leasing, and international financial management.

H ADM 722 Hospitality Financial Management
Spring. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of preenrollment. G. Potter.

Covers both managerial accounting and financial management as they are practiced in the hospitality industry. Topics include hospitality accounting systems and internal control, financial statement analysis and interpretation, operational analysis, cost behavior, budgeting and forecasting, pricing, and feasibility analysis.

FOOD AND BEVERAGE MANAGEMENT

H ADM 136 Introduction to Food Service Operations
Fall and spring. 4 credits. Limited to hotel students. Required. G. Norkus, D. Reynolds, A. Susskind.

An introduction to the principles of food and beverage management, beginning with an overview of the food service industry at large. Attention is focused on major industry segments, business practices, and trends. Detailed consideration is given to the components of the food service system: marketing, menu planning, logistical support, production, service, controls, and quality assurance. Product and systems differentiation in various industry segments is emphasized.

H ADM 230 Introduction to Culinary Arts
Fall and spring. 2 credits. Limited to non-hotel students. Priority given to seniors and graduate students. S-U grades only. Attendance at first class is mandatory. Absolute drop deadline for fall is September 7; spring drop deadline is February 1. Elective. There will be a course fee of $60 which includes the cost of a uniform and uniform cleaning. S. Gould, T. O'Connor, R. White.

Studies of food groups, their respective methods of preparation, cooking, presentation, and holding. Designed for non-hotel students who are interested in learning the professional approach to food preparation and service with hands-on practice. Food product identification, preparation and service methods, and professional language of food and cooking.

H ADM 236 Culinary Theory and Practice
Fall and spring. 4 credits. Prerequisite: H ADM 136. Attendance at first class is mandatory. Required. T. O'Connor, R. Spies, R. White.

Designed to introduce the student to food and beverage operations through three major components: fundamental food composition and properties, food products and preparation, and food safety and sanitation. Students will prepare recipes, menus, and production schedules and will develop the ability to recognize properly prepared foods by preparing, tasting, and evaluating foods. They also will plan menus, develop recipes and produce them in a final project.

H ADM 332 Reviewing the Restaurant: The Consumer's View of the Dining Experience
Fall. 3 credits. Field trip $325. Limited to 20 students with written permission. Prerequisites: H ADM 165 and 335, or permission of the instructor. Elective. N. Dahl, G. Pezzotti.

Trains the student to perform a comprehensive analysis of the restaurant dining experience. The role of the restaurant critic/reviewer will be discussed in depth. The student will examine and enhance his or her critical writing skills, as the course will require each student to complete approximately ten restaurant reviews.

[H ADM 333 Current Issues in Food Safety and Sanitation
Fall. 2 credits. Three-credit registration limited to 12 students. Elective. Not offered fall 2001. Faculty.

A study of current issues in food safety and sanitation procedures and regulations that affect managerial decisions in food service and hospitality operations. Topics include risk assessment and hazard analysis; legal responsibilities related to food, food handlers, equipment and facilities; food-borne illness and other public-health concerns; and certification and training. Preparation for NIFI/NRA certification and the Food Protection (ETS) certification exam (optional) is offered.]

H ADM 334 Wine and Food Pairing Principles and Promotion
Spring. 2 credits. Limited to 20 hotel juniors, seniors and graduate students. No out of college registration is permitted. Prerequisite: H ADM 430 or permission of instructor. Elective. G. Pezzotti.

Focuses on the pairing and marketing of wine and food. Students develop an understanding of regional and varietal wine styles; how foods' flavors can change a wine's flavor, and the promotion of wine and food. Topics include wine and food pairing principles, cuisines and their flavor components, food trends in restaurants and in the home, special event planning, and wine list development. Students design and present wine and food tastings to industry guests.

H ADM 335 Restaurant Management
Fall and spring. 4 credits. Limited to 30 hotel school students per lab; others by permission of instructor. Prerequisites: H ADM 136 and 236. Approximate cost of utensils and manual, $85. Once enrolled, students may not drop the course without permission of instructor. Required. D. D'Aprix.

A restaurant-management course in which each student participates as a manager of a full-service restaurant operation. Topics include operational issues, customer satisfaction, restaurant trends and challenges defining a service philosophy, and management development. The laboratory is based on a hands-on managerial component, including the development of a business plan and post-analysis of the operation. Students become familiar with all aspects of a restaurant operation.

H ADM 338 Seminar in Culture and Cuisine
Fall. 3 credits. Limited to 20 students. Prerequisites: H ADM 165 and 236 (or 230), or permission of instructor. Elective. R. Spies.

Explores various cuisines in terms of history, lifestyle, and foods peculiar to a culture. Through readings, research, and meal preparation, students explore various cuisines in depth. The goal of the course is to develop an awareness of several international cuisines, enabling students to make comparisons among the foodways of different cultures. Students prepare research reports and oral presentations, and design menus and orchestrate their preparation.

H ADM 339 Wine in Culture and History
Fall and spring. 2 credits. Limited to 200 students. Fall regions: Germany, Italy, and Champagne. Spring regions: Bordeaux, Burgandy, and California. Elective. A. Nash.

This course provides students a cultural and historical perspective on wine and its place in society. Through lectures, videos, guided discussions, and readings students examine the history, people, culture, and production of wine in the world's great wine regions. Also covered are wine and health issues, wine and food pairing, and retail wine buying and storage strategies. Different regions are covered in the fall and spring so the course may be taken both terms. Neither term is a prerequisite for the other, nor are H ADM 430 Introduction to Wines and H ADM 339 prerequisites for the other. **Students may not add this class after week two**.

H ADM 430 Introduction to Wines
Fall and spring. 2 credits. Wine glass kit and course fee, $30.00. Limited to hotel school juniors, seniors, and graduate students, and seniors and graduate students in all other colleges. **Hotel students encouraged to enroll in the fall.** Students are exempt from the 21-year old age requirement under Section 65 of New York State Law. S-U grades only. Elective. S. Mutkoski, A. Nash.

An introduction to the major wine-producing regions of the world and what the consumer needs to know to purchase wines, spirits, and beers at retail outlets and in a restaurant setting. Topics include flavor components in wine, pairing wine and food, responsible drinking, selecting quality and value wines, and wine etiquette. Samples from a variety of countries, regions, and vineyards are evaluated.

(Preregistered students who do not attend the first class and fail to notify the course secretary in 274 Statler of their absence before the first class are automatically dropped from the course. The student must then follow the normal drop procedure in his or her school. **Because of the high demand for this course and because a product is consumed, the absolute drop deadline for all students is September 14 in the fall and February 1, 2001 in the spring.)**

H ADM 431 Seminar in Independent Restaurant Operations Management
Fall and spring. 3 credits. Five field trips, $325. Limited to 20 students, with written permission of instructor. Elective. G. Pezzotti.
Designed for students who have a strong interest in food and beverage operations and who may be considering a career as an entrepreneur. Students visit and analyze various independently owned restaurant operations. Analysis covers the restaurant's concept (market), organization, ownership, management, physical structure, staff, front- and back-of-the-house operations, and fiscal integrity. Readings relevant to current topics in the restaurant industry are required. Classes alternate weekly between field trips and seminar/case presentations.

H ADM 432 Contemporary Healthy Foods
Fall. 3 credits. Field trip, $50. Limited to 25 seniors and graduate students, or by permission of instructor. Prerequisite: H ADM 335 or equivalent. Elective. M. Tabacchi.
Builds a greater awareness and understanding among nutrition and food service professionals of the origins and manifestations of today's health-conscious and educated food service patron. Topics include the marriage of nutrition and the cuisine demanded by today's consumer, fresh produce, lean meats, and lack of fabricated diet foods. Menu design includes creativity and nutrient density of foods. Major emphasis is on preparation, marketing, merchandising, and selling of healthy menus in Statler's outlets.

H ADM 433 Contract Services Management
Fall. 3 credits. Field trips, $25–50. Limited to 25 juniors, seniors, and graduate students. Prerequisites: H ADM 136 and 236. Elective. D. Reynolds.
Operations in business and industry, healthcare, and education, as well as other on-site segments, represent more than one-fourth of total restaurant industry revenues. Addresses the major differences between on-site food service management and traditional restaurant management with particular focus on organizational structure, competitive challenges, revenue enhancement/cost containment, labor issues, systems design, and branding. Readings, discussions with industry leaders, cases, site visits, and an integrated research project.

H ADM 434 Desserts Merchandising
Spring. 3 credits. Limited to 25 students. Prerequisite: H ADM 230, 236, or permission of the instructor. Elective. R. White.
This course is designed especially for those who want to manage the dessert function of a restaurant or hotel. Lectures emphasize current trends in dessert menus as well as profitability considerations. Lab work concentrates on techniques necessary to produce a high-quality, profitable dessert menu.

H ADM 435 Selection, Procurement, and Supply Management
Fall. 2 credits. Students may enroll in Lecture 1 or Lecture 2, or both. Lec. 1: First seven weeks of the semester: Selection, Procurement and Supply Management I. Limited to 30 Hotel juniors, seniors, and graduate students, others by permission. **First seven weeks of the semester, drop deadline is September 6, 2001.** Lec. 2: Second seven weeks of the semester: Selection, Procurement and Supply Management II. Limited to 12 Hotel juniors, seniors, and graduate students, others by permission. **Second seven weeks of the semester, drop deadline is October 25, 2001.** Prerequisites: H ADM 136 and 236, or 731. Elective. G. Norkus.
Lec 01: Selection, Procurement and Supply Management I. This course deals with contemporary management issues related to the procurement activities of the hospitality industry. The course focuses on both the food distribution industry and the hospitality industry so that students understand the role that the distributor plays in the movement of food and supplies from the producer to the hospitality operator, and how the creation of distributor partnerships serves to improve efficiencies and reduce costs. Topics covered include: distribution channels and intermediaries in the supply chain; food distributor financial statement analysis; evaluation and selection of suppliers; buying strategies, purchase timing and inventory management; and the emerging role of the Internet and e-procurement service providers.

Lec 02: Selection, Procurement and Supply Management II. This course deals with the major "center of the plate" commodities used by the foodservice industry: beef, veal, lamb, pork, poultry, game, and seafood. The course focuses on the selection decisions that students will be faced with when managing the procurement of these products in a foodservice operation. Topics covered include: composition and structure; government inspection and grading activities; product identification; factors affecting palatability and safety; yield tests; cost analysis of fabrication; and sensory evaluation.

H ADM 436 Beverage Management
Fall and spring. 2 credits. Limited to 25 hotel school juniors, seniors, and graduate students. No out of college registration is permitted. Prerequisite: H ADM 430 (co-registration is not allowed). Elective. S. Mutkoski, A. Nash.
Designed for students who intend to pursue food and beverage as a career. Deals specifically with the management of beverage operations. Lectures develop skills in and awareness of dram shop liability; staff training and responsible customer service; beverage pricing; food and wine pairings; wine list development; purchasing, storage, and service; wine regions; cost controls and loss prevention; and creative beverage merchandising. Guest lecturers.

H ADM 437 Specialty Food and Beverage Operations: Guest Chefs
Spring. 3 credits. Limited to 20 juniors, seniors, and graduate students. Prerequisite: H ADM 335 or 731. Elective. G. Pezzotti, H. Winslow.
Designed for students with a strong food and beverage orientation, especially students considering careers in the hotel food and beverage environment, or those who anticipate interacting with current culinary trends. Working in groups, students market, organize, plan, produce, serve, and prepare the financial analysis and accounting relative to four guest chef specialty production nights for the Cornell community, utilizing the Statler Hotel facility. Final project.

H ADM 438 Catering Management
Spring. 2 credits. Field trip, $180. Limited to 25 students. Prerequisite: H ADM 236 or permission of instructor. Elective. R. Spies.
Examines on- and off-premise catering for business and social functions, as well as sports events and office catering. Topics include the organizational structure of catering operations; legal aspects of catering businesses; menu design for special functions and its operational implications; marketing from a caterer's perspective; function planning and management; staff recruitment, training, and supervision; and post-event analysis. Site visits and analyses of actual catering operations.

H ADM 530 Anheuser Busch Seminar in Quality Brewing and Fine Beer
Fall. 1 credit. First 7 weeks of the semester. Prerequisite: H ADM 430. Elective. Local field trip, no cost. The deadline to drop is the mid-point of the course. G. Pezzotti.
Designed for upper-level students who intend to pursue food and beverage careers. Serves to advance one's knowledge about beers in terms of managing such products in a restaurant setting or other food service outlet. Topics include the brewing process, sensory aspects of beer, international beer types and styles, marketing malt products, purchasing and distribution, storage and service, beer and food pairings, staff training and education, cost controls, and third party liability issues.

H ADM 631 Case Studies in Multi-unit Restaurant Management
Spring. 3 credits. Limited to 20 graduate students, seniors by permission. Elective. Faculty.
Case studies of multi-unit restaurant organizations will focus on topics such as: new venture planning, rapid growth and organizational change, market identification, service delivery and design, consumer demand, corporate culture, production planning and operations management, strategic planning and implementation, tactics and market responses, international expansion, breakpoints and breakthrough thinking. Each class period will be spent in student-organized discourse and exchange based upon their assigned written case analysis. Grading will be on individual case presentations, class participation and written case assignments.

H ADM 632 Spa and Spa Hotel and Resort Development and Management
Fall. 3 credits. Limited to 30 seniors and graduate students. Two field trips, $75–100. Prerequisite: previous courses in food and beverage management and marketing. Elective. M. Tabacchi.
This course emphasizes the development management and marketing aspects of spas, health clubs, and spa resorts. Topics include feasibility of success and marketing research necessary to establish new spas, design of menus, mental and physical fitness programs,

stress management, spa medical treatments, complementary medical treatments, and other spa programs. Other topics include required personnel, safety, legal and ethical issues, and integration of nutritious menu items and their marketing and merchandising. Guest speakers.

H ADM 639 Airline In-flight Management and Food Services
Spring. 3 credits. Limited to 30 seniors and graduate students, others by permission. Field trip, $75–100. Prerequisites/ Corequisites: H ADM 136, 236, or permission of the instructor. Elective. M. Tabacchi.
Focuses on the challenge of preparing and distributing 20,000–30,000 meals per day to 20–30 different airline carriers and rethermalizing, serving, and clearing those meals at 30,000 feet in confined space and short periods of time. Examines strategies, planning, and forecasting by airline, airline catering, and sales executives, as well as the effect of the economy and the airline's competition upon the type of meals served.

H ADM 731 Graduate Food and Beverage Management
Spring. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of pre-enrollment. A. Susskind.
Focuses on the technical, managerial, and human resource skills needed to be successful in food service management. Topics include market analysis, concept development, menu planning, operations management, marketing, and current and future issues affecting the food service industry.

MARKETING AND TOURISM

H ADM 243 Marketing Management for the Hospitality Industry
Fall and spring. 3 credits. Limited to 80 hotel students per lecture, not open to freshmen. Required. M. Lynn, J. Siguaw.
Helps students acquire the knowledge and skills necessary to get and keep profitable customers in today's competitive business environment. Topics are product quality, branding, pricing, personal selling, advertising, sales promotions, market segmentation, target marketing, product positioning, and marketing research. Class exercises, assignments, and essay exams.

H ADM 343 Marketing Research
Fall and spring. 3 credits. Limited to 32 students. Prerequisites: Introductory principles of marketing or marketing management and an introductory course in quantitative methods for management. Elective. Not offered fall 2001. Faculty.
Introduces students to the basic techniques and practices used to collect, analyze, and disseminate data for decision making in hospitality marketing. The goal is to help future managers develop a level of research competency that will enable them to interact intelligently with marketing research providers when requesting information, assessing proposed research projects, as well as evaluating and using information from completed research.

H ADM 344 Tourism I
Fall and spring. 3 credits. Not open to freshmen. Elective. M. Noden.
An introductory course in the study of tourism. The origins and evolution of contemporary tourism are examined. Students are familiarized with the various supply components of the tourism industrial base and their integration on an international scale. The effects of mass-volume tourist demand on destination development are explored through the use of selected limited case studies. Guest lectures highlight the economic operations and effects of tourism in both the public and private sectors.

H ADM 345 Hospitality Sales
Fall and spring. 3 credits. Limited to 24 students. Prerequsite: H ADM 243, 741, or equivalent. Elective. J. Siguaw.
An in-depth study of the promotional tool of personal selling, with an emphasis on identifying and meeting the needs of the customer. Course material encourages the use of intuition, judgment, logic, problem-solving methodology, and other tools as part of an overall sales mix. Class sessions involve lectures, role playing, videos, presentations, and guest lectures.

H ADM 347 Consumer Behavior
Spring. 3 credits. Limited to 45 juniors and seniors. Prerequisite: an introductory principles of marketing or marketing management course. Elective. M. Lynn.
Helps students become better at understanding, predicting, and influencing consumer behavior. Topics are motivation, perception, learning, decision making, persuasion, compliance, geo-demographics, and psychographics. Applications of the material to hospitality marketing issues such as guest frequency programs, menu design, advertising, personal selling, and promotion strategy will be stressed through class exercises, a term paper, and essay exams.

H ADM 442 Strategic Marketing
Fall. 3 credits. Limited to seniors. Prerequisite: a previous marketing course. Elective. C. Dev.
Offers theoretical and practical approaches addressing strategic marketing challenges in hospitality and service firms. Strategic marketing concepts and principles will be learned through lectures, discussion, case studies, and development of a strategic marketing report.

H ADM 444 Tourism II
Spring. 3 credits. Limited to juniors, seniors, and graduate students. Prerequisites: H ADM 243, 244, or equivalents, or written permission of instructor. Elective. M. Noden.
An advanced course in the study of tourism. Emphasis is placed on the development of the tourism industrial base and development and financing of superstructure and infrastructure. Students are expected to engage in a wide range of discussions and analysis of the effects of tourism on various environments in social and economic terms. Case studies, occasional guest lectures.

H ADM 445 Services Marketing
Fall. 3 credits. Limited to 40 students. Prerequisite: a previous marketing course or permission of instructor. Elective. L. Renaghan.
Students preparing for management positions will develop an understanding of services marketing principles applicable to the hospitality industry. Topics include marketing strategies of service firms, new marketing approaches, and the reformulation of traditional marketing principles from consumers and industrial goods marketing. Case studies, guest speakers.

H ADM 446 Marketing Planning for Hotels
Spring. 3 credits. Prerequisites: H ADM 243, 741, or equivalent. Elective. L. Renaghan.
Students learn about the key variables in property-level management and their proper application in developing a marketing plan, e.g., marketing intelligence, demand analysis, supply and competitor analysis, segment analysis, resource allocation, sales strategies, and measurement of results. Test material, cases, relevant articles, lectures, and key speakers. Upon completion of the course, the student should be able to design, develop, and implement a comprehensive, targeted, and action-oriented marketing plan for a lodging property.

H ADM 447 Channels of Distribution in Tourism
Spring. 3 credits. Prerequisite: H ADM 243. Elective. M. Noden.
Examines the major elements of the structure, arrangement, management, and control of the channels of distribution in the tourism industries. Topics include emerging trends in electronic distribution, organizational structures of distributive consortia, and their effectiveness in service distribution. Significant readings, guest lectures.

H ADM 448 Marketing Communications
Spring. 3 credits. Prerequisite: a previous marketing course. Elective. C. Dev.
Provides students with a managerial understanding of the effective use of a variety of marketing communication media, including advertising, sales promotion, public relations, etc. Hospitality industry emphasized.

[H ADM 641 Marketing Decision Models for Service Firms
Fall. 3 credits. Limited to 20 seniors and graduate students. Prerequisite: a principles of marketing or marketing management course and an introductory course in quantitative methods for management. Elective. Not offered fall 2001. Faculty.
Introduces students to advanced data analysis and modelling methods used for decision making in hospitality marketing.]

H ADM 642 Strategic Marketing
Fall. 3 credits. Limited to graduate students. Prerequisite: a previous marketing course and permission of instructor. Elective. C. Dev.
Offers theoretical and practical approaches to addressing strategic marketing challenges in hospitality and service firms. Strategic marketing concepts and principles will be learned through lectures, discussion, and development of a strategic marketing report.

H ADM 643 Marketing Research
Fall and spring. 3 credits. Limited to 20 graduate students. Prerequisites: introductory principles of marketing or marketing management and an introductory course in quantitative methods for management. Elective. Not offered fall 2001. Faculty.
This course provides an understanding of several analytical tools that can facilitate marketing decision making. Students will learn techniques for segmenting markets, identifying brand positioning, and developing and

revising product concepts. They will also learn how to develop reliable and valid instruments for measuring consumer reactions. The overall goal is to help future managers develop skills that will enable them to interact intelligently with information providers and to be better decision-makers.

H ADM 644 Food and Beverage Marketing Strategy
Spring. 3 credits. Limited to graduate students, seniors by permission. Prerequisite: prior 3-credit marketing course. Elective. Faculty.
Focuses on how to apply marketing, sales, and merchandising techniques to the commercial food and beverage industry. Addresses developing a market segmentation based on understanding the needs and wants of potential target markets, translating needs and wants into a viable food service concept positioning strategy, and marketing strategies used to maintain and increase sales and market share. Recitation and analysis involves substantial use of the Consumer Report on Eating Share Trends (CREST) database.

H ADM 645 Services Marketing
Spring. 3 credits. Limited to graduate students. Prerequisite: previous marketing course, or permission of instructor. Elective. L. Renaghan.
Helps students preparing for ownership or management positions develop an understanding of services marketing principles applicable across the entire service sector. Marketing strategies of service firms from various service industries will be evaluated. New marketing approaches uniquely applicable to services are considered as well as the reformulation of traditional marketing principles from consumers and industrial goods marketing. Case studies, guest speakers.

[H ADM 646 Marketing Planning for Hotels
Fall. 3 credits. Limited to graduate students. Prerequisite: H ADM 243, 741, or equivalent. Elective. Not offered fall 2001. Faculty.
For description, see 446. This course includes the H ADM 446 lectures plus a theoretical paper.]

[H ADM 647 Consumer Behavior
Fall and spring. 3 credits. Limited to 25 graduate students. Prerequisite: introductory marketing principles or marketing management course. Elective. Not offered 2001–2002. M. Lynn.
For description, see H ADM 347.]

H ADM 741 Marketing Management
Spring. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of pre-enrollment. C. Dev.
Deals with the management of the marketing function in hospitality enterprises. Primary objectives are to introduce students to the basic concepts and principles underlying marketing decision making and to provide the skills needed to analyze and understand complex marketing situations in order to plan and implement marketing programs.

PROPERTY ASSET MANAGEMENT

H ADM 255 Hotel Development and Planning
Spring. 3 credits. Limited to 20 sophomores, juniors, and seniors per section. Required. R. Penner, S. Robson.
An introduction and management overview of the problems and opportunities inherent in the development and planning of hospitality facilities. Topics include the project development sequence; conceptual and space planning; architectural design criteria, construction management; and the interpretation of architectural design and consultant drawings. Emphasis is on setting appropriate facilities requirements, understanding industry practice, and implementing properties decisions within a balanced design, operations, and financial framework.

[H ADM 350 Real Estate Management
Fall. 2 credits. First 7 weeks of the semester. Elective. Not offered fall 2001. J. deRoos.
Introductory course designed for students interested in learning the principles of property management for residential and commercial real estate. Lectures will provide an overview of the different aspects of property management such as leases and management contracts (including landlord/tenant issues), accounting and finance, staffing, and building operations. Case studies.]

H ADM 351 Hospitality Facilities Design
Fall. 4 credits. Prerequisite: H ADM 255 or 751 or permission of instructor. Elective. R. Penner, S. Robson.
A lecture-studio course dealing with property development, planning, and design by focusing on the interpretation and analysis of hotel plans. Students learn basic graphic techniques and apply them to planning problems for hospitality facilities. Final project.

H ADM 352 Hotel Planning and Interior Design
Spring. 3 credits. Field trip, $250; drawing supplies, $100. Limited to 18 students. Prerequisite: H ADM 351 or permission of instructor. Elective. R. Penner.
A project course in which student teams develop operational criteria and a complete interior design presentation for a new hotel or major renovation. The early semester includes a number of short design exercises. A field trip to a northeastern city introduces students to the particular hotel and its requirements. During the rest of the term, the teams will replan the hotel public areas and guestrooms, develop conceptual designs, establish preliminary budgets, and assemble presentation boards to describe the design.

H ADM 353 Food Service Facilities Design
Fall and spring. 3 credits. Limited to 24 students. Prerequisites: H ADM 335 and 351 (co-registration is allowed) or food service experience or permission of instructor. Elective. S. Robson.
An introduction to the basic concepts of food service facilities design and planning. Students will determine space allocations for kitchens and their support areas; develop basic production work flow in the preparation and service areas; and select equipment utilizing standards for production capability, quality of construction, and ease of maintenance. Students will use studio time for planning, designing, and writing specifications for a medium-size restaurant kitchen.

H ADM 354 Computer-Aided Design
Fall and spring. 2 credits. Limited to 18 students per lecture. Prerequisite: H ADM 351 or equivalent studio experience. Attendance at first class is mandatory. Elective. S. Curtis.
The operation of microcomputer-based computer-aided design (CAD) systems. Using AutoCAD on the IBM PC, the course presents an organized and logical sequence of commands, mode settings, drawing aids, and other characteristics of CAD. Students will learn the program in the school's computer center and will develop a complete graphic presentation. Emphasis is on the use and operation of CAD systems in a commercial document production environment.

H ADM 355 Hospitality Facilities Operations
Fall. 3 credits. Limited to 20 students per section. Prerequisite: H ADM 255. Required. M. Redlin.
An overview of the operation of hospitality facilities, including operating costs for various types of facilities, types and characteristics of major building systems, and the responsibilities of the engineering-maintenance departments. The renovation needs of hospitality facilities are examined and key managerial aspects of renovations considered.

H ADM 356 Hospitality Risk Management
Spring. 3 credits. Limited to sophomores, juniors, seniors, and graduate students. Elective. D. Stipanuk.
A comprehensive look at risk management within the hospitality industry. Addresses issues of loss control for hospitality firms. Using a risk management conceptual framework, issues in fire protection, customer and workplace safety, OSHA, and customer and corporate security are analyzed.

H ADM 357 Insurance and Risk Management
Fall and spring. 3 credits. Prerequisite: an introductory accounting or business course. Elective. G. Shankar.
A comprehensive look at risk management within a general business or institutional environment. Reviews insurance and non-insurance solutions to controlling loss, the general legal environment within which risk management processes work, and the integration of crisis management into the overall corporate risk management plan.

H ADM 450 Principles of Real Estate
Fall. 3 credits. Limited to juniors and seniors. Elective. Faculty.
Approaches real estate from four perspectives: legal, economic, financial, and business. Understanding these perspectives will enable students to make better investment and financing decisions, to use real estate resources wisely, to understand public-policy issues, and to be prepared for additional courses in real estate investment, finance, and development.

H ADM 452 Sustainable Development and the Global Hospitality Industry
Fall. 3 credits. Limited to juniors, seniors, and graduate students. Elective. D. Stipanuk.
A multidimensional course integrating the global sustainability and environmental movements, their impact on the hospitality

industry, and responses to and opportunities associated with the sustainability movement. The course draws upon work in a number of disciplines for the ideas and concepts discussed. Readings will be drawn from the environmental, sustainability, and hospitality literature. Students should be prepared to encounter conflicting views in the readings and in classroom discussions. The course attempts to portray a variety of viewpoints regarding issues of contemporary interest to society and the business community. Discussion of these issues is a key component of the course.

[H ADM 454 Advanced Computer Aided Design

Spring. 3 credits. Limited to 18 students. Prerequisite: H ADM 354 or equivalent introductory AutoCAD course. Elective. Not offered spring 2002. S. Curtis.

Computer aided design has grown beyond its traditional use as a tool to draw contract documents. This course will give students an understanding of the more advanced capabilities of AutoCAD, including raster image support, OLE, 3-D surface and solid modeling, and photorealistic rendering. The availability and capabilities of "third party" plug-ins to AutoCAD will also be explored. There will be weekly projects as well as a final project.]

H ADM 456 Hospitality Facilities Management

Spring. 3 credits. Prerequisite: H ADM 355, 751, or permission of the instructor. Elective. D. Stipanuk.

A managerial approach to hospitality facilities addressing issues of owning and operating, cost management, facilities services and delivery systems management, governmental regulatory compliance, and emerging issues. Emphasis on environmental issues such as indoor air quality, waste management, and energy conservation. Extensive use of the web.

H ADM 457 Advanced Development and Construction

Fall. 3 credits. Overnight field trip, $175. Limited to juniors with permission, seniors and graduate students. Elective. D. Stipanuk.

Focuses on the management structure and systems, laws, regulations, and industry practices that most influence the successful development of commercial and residential real estate, including lodging and eating facilities. Topics include scheduling, budgeting, managing other professionals, and analysis of alternative materials and methods. Guest speakers, case studies, and group project.

H ADM 458 Hospitality Real Estate

Spring. 3 credits. Limited to 40 seniors or graduate students. Prerequisites: H ADM 323, 450, or permission of instructor. Elective. Faculty.

Expands the student's understanding of the role of real estate in individual hospitality businesses and corporations. Designed for those who plan careers in the hospitality industry. Specific objectives are to develop an appreciation of real estate as a factor in the production of income for hospitality businesses; to develop an appreciation of real estate as an asset that can be managed, sold, and otherwise used to increase the wealth of hospitality corporation shareholders; and to understand the importance of valuing real estate, and the approaches to valuation and contemporary hospitality valuation issues.

H ADM 459 International Hospitality Development

Spring. 3 credits. Limited to 30 seniors and graduate students. Elective. J. Clark.

A seminar course covering the strategic development of international hospitality projects. Topics will include corporate expansion strategies; the international development process; viewpoints of public and private stakeholders; and such development challenges as technology, infrastructure, environmental concerns, and public policy issues. Senior corporate guest lecturers will present and discuss new projects in such locations as Hawaii, Mexico, western and eastern Europe, Southeast Asia, and Latin America and contrast these opportunities with development in the United States.

[H ADM 550 Principles of Timeshare Development and Operations

Fall. 2 credits. Second 7 weeks of the semester. Elective. The deadline to drop is the mid-point of the course. Not offered fall 2001. J. deRoos.

Provides an intense introduction to the rapidly growing timeshare and vacation ownership industry. Students will learn who the four major business disciplines of financial management, real estate development, marketing and sales, and resort operations are specifically applied to the industry. Guest speakers, course project, and case studies.]

H ADM 651 Principles of Real Estate

Fall. 3 credits. Limited to graduate students. Elective. Faculty.

This survey course approaches real estate from four perspectives: investment, market, mortgage finance, and legal. Understanding these perspectives will enable students to make better investment and financing decisions, to use real estate resources wisely, to understand public policy issues, and to be prepared for additional courses in real estate investment, finance, and development. This course includes much of the material in H ADM 450 plus special topic sessions that feature guest speakers from the industry, faculty from other colleges, and case studies.

H ADM 658 Advanced Real Estate

Spring. 3 credits. Limited to 40 graduate students. Prerequisites: H ADM 323, 450, 621 or 651. Elective. D. Quan.

Promotes sound real estate investment and finance decision making through the use of advanced theory and techniques in financial economics. Real estate investment decisions are made through applications of the after-tax discounted cash flow model which incorporates prevailing domestic and international economic conditions in real estate markets, tax rules, and government regulations. Financing decisions are made using the techniques of modern financial analysis. A wide array of financing options is considered including convertible, participating, and accrual mortgages. All types of residential and nonresidential real estate are analyzed, including hospitality properties.

H ADM 751 Properties Development and Planning

Spring. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of pre-enrollment. J. deRoos, M. Redlin.

Provides an overview of project development, hotel planning, and the construction process, including the role of the development team, feasibility, functional planning and design, interpretation of architectural drawings, architectural and engineering criteria, construction management, contracts, and scheduling. Student teams will prepare the program documentation for a new hotel or one undergoing major rehabilitation in conjunction with other professional master's core courses.

COMMUNICATION COURSES

H ADM 165 Managerial Communication I

Fall and spring. 3 credits. Each lecture limited to 16 students. Note: Students required to take this course generally may not delay it. If extenuating circumstances exist, student must petition to drop the course by the end of the first week of classes. This course must be taken within the first two semesters, including any ITD semesters. Add/drop and section changes must be approved by the chairperson. Required. D. Jameson, S. Jones, Y. Kim, C. Snow, R. Steinacher.

An introduction to the role and importance of effective communication in managerial work, especially in the hospitality industry. Development of abilities in analytical thinking and clear written expression. The process of planning, preparing, and executing professional communications with an emphasis on written documents. Students write a series of business documents and give oral presentations.

H ADM 266 Intermediate French: Le Francais de l'Hotellerie et du Tourisme

Spring. 3 credits. Limited to 15 students. Prerequisite: French 123 or permission of instructor. Elective. A. Grandjean-Levy.

Offers continuing study of the French language with specific emphasis on the hospitality industry. Material presented considers cultural, geographic, economic, historical, political, and social contexts within which the business functions. The course is conducted in French, emphasizing a conversational approach. Specialized situations and vocabulary are used in building general competence in practical usage. Students with special interest in the hospitality industry will be given priority for admission.

H ADM 364 Advanced Business Writing

Fall and spring. 3 credits. Limited to juniors, seniors, or graduate students, or written permission of instructor. Prerequisite for undergraduates: H ADM 165 (for hotel school students) or completion of student's freshman writing requirement. Elective. S. Bryson, Y. Kim, R. Steinacher.

Focuses on communicating challenging messages in business contexts. Writing assignments will emphasize delivering persuasive messages, working with tone and style, and developing different types of documents in professional contexts. Assignments include business letters and memos written for various contexts, procedures and policy statements, promotional materials, negative messages, and analytical reports requiring research.

H ADM 365 Managerial Communication II
Fall and spring. 3 credits. Limited to 22 juniors and seniors per lecture. Note: Students required to take this course generally may not drop it; however, students may be allowed to drop before the first class meets if the area has a wait list and the vacancy can be filled. Students may drop between the first and second class if they (1) check first with the course chair, and (2) can find a replacement for their place in the course. Students may not drop after the second class unless they petition and present a case of extenuating circumstances. It is expected these cases would be rare. Prerequisites: Hotel undergraduates must have completed H ADM 165 and H ADM 115. Required. N. Dahl, Y. Kim, E. Roberts, C. Snow.
A broad study of communication in a management context. Emphasizes the significant role of communication in developing work relationships that enable managers to achieve their goals. It presents the theories and principles of communication that underlie effective performance. Students increase their individual communication abilities by applying these concepts in a variety of managerial contexts, including interacting one-to-one, working in groups, and formally developing and presenting ideas to larger audiences.

H ADM 462 Communication and the Multicultural Organization
Fall and spring. 3 credits. Priority given to hotel students. Elective. S. Bryson.
Influence of culture, perception, and gender on communication in multicultural organizations, including international and domestic businesses with diverse work forces. Focus is on human interaction at work. Special emphasis on the hospitality industry. Topics include values and beliefs, how race and gender affect language use, cultural differences in nonverbal communication, ethnocentrism and stereotyping, intercultural sensitivity and adjustment, cultural variables, persuasion, and ethics of communication in international business. Concepts are applied to practical management situations.

H ADM 463 Persuasive Communication in Organizations
Spring. 3 credits. Limited to 18 students. Prerequisites: H ADM 165 and 365 for hotel undergraduates, or permission of instructor. Elective. Faculty.
Prepares students to communicate effectively in a variety of persuasive speaking contexts. Principles of persuasion will be thoroughly examined as they apply to managerial communication tasks. Emphasis on persuasive speaking; also relationship between written and oral communication. Studies the principles of persuasion, analyzes case studies in the hospitality industry, and applies persuasive strategies in simulated workplace settings.

H ADM 661 Organizational Communication for Managers
Spring. 3 credits. Elective. Faculty.
Provides an in-depth understanding of the theory and practice of organizational communication. Structured around the communication tasks managers must accomplish in order to be effective on the job: communicating to diverse audiences, resolving conflicts, making presentations, and influencing colleagues. Students read and discuss a series of articles to increase knowledge of organizational communication issues and expand their understanding of the political, sociological, and ethical dimensions of problems in organizational communication.

H ADM 761 MMH Managerial Communication
Fall and spring. Variable credits. Limited to MMH students. Elective. N. Dahl, D. Jameson, C. Snow.
Instruction in communication and leadership skills helps MMH students reach their individual professional development goals, enrich their education, perform well on course assignments, and meet the program benchmarks in managerial writing, presentational speaking, and group process and leadership.

OPERATIONS MANAGEMENT, INFORMATION TECHNOLOGY COURSES

H ADM 174 Microcomputing
Fall and spring. 3 credits. Limited to hotel school freshmen and transfers. Limited to 30 students per section. Required. R. Alvarez, P. Clark, M. McCarthy, R. Moore.
This course is designed to aid students in building functional computer literacy. Students will develop their skills in five generic areas: text, graphics, spreadsheet, presentation, and listing processing. This portion of the class is taught in the Binenkorb computer lab, where students work with Microsoft Office and the Internet. In addition, students learn introductory statistical concepts, including descriptive statistics, correlation, and regression analysis. Course material is presented through a combination of lectures and labs.

H ADM 274 Microcomputing
Spring. 3 credits. Limited to 30 non-hotel students per lecture. R. Moore.
An introduction to microcomputing to develop functional computer fluency. Students will develop their skills in five generic areas: text, graphics, spreadsheet, presentation, and file processing. The course is entirely lab-oriented and students work in Windows. Software used is Word, Excel, Powerpoint, and Filemaker.

H ADM 371 Hospitality Quantitative Analysis
Fall and spring. 3 credits. Required. S. Choi, M. Freimer.
Introduces statistical and operations research methods appropriate for the hospitality industry. The overriding goal is to provide students with the skills and understanding necessary for decision making using quantitative data. Students will use computer spreadsheet software extensively. A key element is an ability to communicate the results of the analyses in a clear manner. Topics include probability, decision analysis, modeling, forecasting, quality management, process design, waiting lines, project management, and revenue management.

H ADM 375 Hotel Computing Applications
Spring. 3 credits. Prerequisite: H ADM 174 or equivalent. Elective. R. Moore.
This course exposes students to Internet technology based systems used in the hospitality industry to enhance guest service and support management decision making. Specific topics include global distribution systems, yield management systems, property-management systems, communication networks (LANS and WANS), food service management systems including point-of-sale systems and sales and catering systems, system selection, and cost justification. Laboratories provide students with hands on experience on systems widely used in the hospitality industry that are web based.

H ADM 474 Corporate Information Systems Management
Spring. 3 credits. Limited to juniors, seniors, and graduate students. Elective. R. Alvarez.
Explores 10 key issues in information technology management through use of case studies of companies who have relevant experience with the issues. A basic understanding of information technology, organizational behavior, and general management is advised.

H ADM 475 Information Technology for Hospitality Managers
Fall and spring. 3 credits. Prerequisite: H ADM 174. Required. R. Alvarez, M. McCarthy, R. Moore, M. Talbert.
Composed of two blocks: (1) Lecture—the goal of this block is to provide the students with a broad-base knowledge of Information Technology (IT) management issues. (2) Lab—the goal of this block is to provide the students with advanced Excel model-building skills and concepts.

H ADM 476 Visual Basic for Applications: End-User Programming
Fall and spring. 3 credits. Limited to 25 students. Elective. M. Talbert.
Introductory programming course for end-users (e.g., business managers, consultants, etc.). Students will develop fluency in the popular Visual Basic for Applications (VBA) language. Using VBA, students will learn how to customize and extend the Microsoft Office Suite, with an emphasis on Excel. They also will develop custom information systems using Microsoft Office applications as programmable building blocks. Secondary objectives will be to cover fundamental design and programming principles. Entirely lab-based.

[H ADM 574 Strategies for Internet Business
Fall. 3 credits. Limited to 30 hotel seniors and graduate students. Prerequisite: H Adm 174. Elective. Not offered 2001. G. Piccoli.
Information technologies, and particularly Internet technologies, are revolutionizing business organizations, commerce, and society. This course will explore how such technologies can be leveraged to create shareholder value and can be used to service customers. The fundamental technologies, the economic premises of the new competitive landscape, business strategy in this environment, and the risks these strategies engender will be analyzed. The course will have a managerial orientation but a basic understanding of information technology and a minimum level of proficiency are required. Cases and examples drawn from the hospitality industry will be used, but the topic is more general and a number of applications to other industries will be contemplated as well.]

H ADM 575 Internet Technologies
Fall and spring. 3 credits. Elective. M. Talbert.
This course will introduce students to many of the technical underpinnings of the Internet, such as web browsers, FTP, HTML/DHTML, XML, JavaScript, Java, CGI and multimedia file formats. The primary objectives of the course are to develop an understanding of existing and emerging Internet technologies relevant to business, and to gain proficiency with the implementation of these technologies. Students will select a suitable Internet business model to develop into a business-related web site. The course is entirely lab-based.

H ADM 674 Service Operations Management
Fall and spring. 3 credits. Limited to 25 graduate students. Prerequisite: H ADM 775 or equivalent. Elective. Not offered fall 2001. G. Thompson.
The objective of this course is to improve the understanding of the operations function of service organizations. Focuses on the role and nature of service operations, the relationship of operations to other business functions, and develops skills and provides techniques for the effective management of service operations. Topics include service design, bottleneck and layout analysis, capacity management, work force management, and quality management. Intended for graduate students interested in services management.

H ADM 675 Yield Management
Fall and spring. 3 credits. Limited to 40 students. Prerequisites: H ADM 371, 771, or equivalent. Elective. S. Choi.
Students learn how to effectively apply the principles of yield management. Focuses on the integration of yield management techniques with information technology, internal management issues, and external marketing concerns. Topics include yield management techniques, forecasting, overbooking, group decisions, and management and marketing issues.

H ADM 676 Restaurant Revenue Management
Spring. 2 credits. First 7 weeks. Limited to 30 graduate students, or undergrads with H ADM 335 and 371 by permission of the instructor. Prerequisites: H ADM 731 and 771. Elective. S. Kimes.
Revenue management is a method for profitably managing capacity. The objective of this course is to help students learn how to apply the principles of revenue management to restaurants. The course focuses on methods of managing duration and price with the intent of maximizing revenue per available seat-hour. Topics to be covered include forecasting, overbooking, reservations systems, information technology, process design, pricing, and management and marketing issues.

H ADM 771 Graduate Quantitative Methods
Fall. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of pre-enrollment. M. Freimer.
Covers statistical and operations research techniques which can be applied to the hospitality industry. Topics include descriptive statistics, probability, sampling, correlation and regression, forecasting and yield management. The emphasis is on hands-on application to hospitality problems.

H ADM 772 Information Technology for Hospitality Managers
Fall. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of pre-enrollment. G. Piccolli.
Familiarizes students with issues surrounding the implementation of information technology in supporting hospitality operations from a guest services perspective and decision making from the viewpoint of management.

LAW COURSES

H ADM 385 Business Law I
Fall and spring. 3 credits. Limited to juniors, seniors, and graduate students outside the hotel school, and hotel students by permission of the instructor. Recommended for hotel students, H ADM 387 preferred. Elective. P. Wagner.
Provides students with a presentation of three substantive areas of business law: contracts, intellectual property, and business organizations. Students will read judicial opinions, learn to identify issues, and analyze the issues by applying legal principles.

H ADM 387 Business and Hospitality Law
Fall and spring. 3 credits. Limited to juniors, seniors, and graduate students. Required. D. Sherwyn.
An integrated presentation of employment discrimination, tort and contract concepts as they apply to the legal aspects of hospitality management. Relevant federal and state cases and statutes are examined. The overall objective is to recognize, analyze, and evaluate legal issues for the purpose of making and articulating appropriate decisions.

H ADM 485 Employment Discrimination Law and Union Management Relations
Spring. 3 credits. Limited to juniors, seniors, and graduate students. Prerequisite: H ADM 387 or permission of instructor. Elective. D. Sherwyn.
Anti-discrimination statutes and union management relations are two of the most pervasive legal issues affecting the hospitality industry. Managers must take these issues into account whenever they make a personnel decision. This course will provide students with: (1) an understanding of the discrimination law; (2) a framework for complying with law; (3) a method for using the law to maintain positive employment relations; and (4) an understanding of how to negotiate and administer a union contract.

H ADM 487 Real Estate Law
Fall and spring. 3 credits. Limited to non-hotel students, and hotel juniors, seniors, and graduate students. Recommended: completion of H ADM 387 preferred. Elective. A. Klausner.
Provides students with an understanding of the legal issues surrounding the ownership, transfer, and use and development of real estate. Students will learn to recognize and evaluate legal issues in order to inform the decision-making process with respect to real estate, whether as a business executive, an entrepreneur, or in personal life.

H ADM 589 The Law of the Internet and E-Commerce
Fall and spring. 3 credits. Limited to juniors, seniors, and graduate students. Elective. A. Klausner.
The Internet has changed how business is done in the hospitality industry. The change has created numerous legal issues that courts and legislatures are grappling with. The purpose of this course is to allow students to identify and understand the rapid developments of the law of e-commerce. Specifically, this course focuses on six topics: how the Internet works; consumer protection; privacy; intellectual property (patent, trademark and copyright); personal jurisdiction in cyberspace; and online contracts and legal disclaimers. This course will introduce students to this emerging area of the law and enable them to identify issues so that they can intelligently seek counsel and understand the law as it continues evolve.

OTHER COURSES

H ADM 191 Microeconomics for the Service Industry
Fall and spring. 3 credits. Limited to 60 hotel students per lecture, others by permission of instructor. Required. J. Wissink.
Introduces the basic principles of microeconomics and teaches students how they apply to managers of enterprises associated with the hospitality industry. Emphasis on methods of market segmentation in the service industries, analyzing economic incentives involved in franchise arrangements, and the nature of competition in various segments of the hospitality industry.

H ADM 490 Housing and Feeding the Homeless
Spring. Variable to 4 credits. Limited to juniors and seniors. Elective. T. O'Connor.
Explores the public and private sector partnership in addressing the issue of hunger and homelessness. Through lectures, class discussions, research, community service work, and a field placement practicum, students will explore the economic, social, and political issues of our country's concern with housing and feeding disenfranchised and homeless people. Students will study the history of homelessness and the strategies to prevent and alleviate the problem. Explores public and private sector approaches to addressing the issue of hunger and homelessness. Through lectures, class discussions, research, community service work, and a field placement practicum, students will explore the economic, social, and political issues of our country's concern with housing and feeding disenfranchised and homeless people. Students will study the history of homelessness and the strategies to prevent or alleviate the problem through public policy, housing programs, food assistance programs, and job training initiatives. This is a service learning course centered around community work experience. There are three options for involvement in this course. Students must choose one of the following options: (1) Four-credit option whereby students work in pairs or small groups with a local area agency that provides services for homeless or disadvantaged people. They will analyze the agency's mission and goals, identify managerial

challenges, and formulate an approach in the form of product or service that is useful to the agency. This field practicum will comprise approximately 60 hours of work during this semester, half of which will be in direct contact with the agency and its clients. (2) Four-credit option whereby students will participate in an ALTERNATIVE SPRING BREAK in an agency(ies) in Washington, DC. Students will work five full days in an agency that serves homeless, hungry, or disenfranchised people such as homeless shelters, community kitchens, or battered women's housing units. Housing and transportation are arranged. On the return trip, students will participate in a reflection and focus exercise in a relaxing setting. This option may cost students up to $280. Students interested in this option MUST see the instructor at preregistration time. (3) Three-credit option whereby students do community work in the Ithaca area with an agency that serves homeless, hungry, incarcerated, or disenfranchised people. Students will work on a regular weekly basis for a minimum of 25 hours during this semester.

H ADM 491 Hotel Ezra Cornell
Fall and spring. Variable to 4 credits. Prerequisite: written permission. Elective. Faculty.
Elected board members of Hotel Ezra Cornell receive credit for academic coursework, and the development, organization, and management of the April "Hotel-for-a-Weekend." Students who are considering a board position may pre-enroll for the course and should speak with the instructor for additional information about board positions and required coursework. Elections will take place in April after Hotel Ezra Cornell Weekend, at which time the HA 491 course enrollment will be finalized. **Students must be in good academic standing and have a GPA of at least 2.0 in the preceding term.** Further information is available in the Student Services Office, 178B Statler Hall.

H ADM 493 Management Intern Program I—Operations
Fall and spring. 6 credits. Limited to hotel juniors and seniors with approval of the MIP faculty committee. Prerequisites: students are expected to have completed H ADM 105, 115, 211, 121, 221, 222, 136, 236, 243, 255, 165, and 174. In addition, completion of the following courses is strongly recommended: H ADM 321, 335, 355, and 365. Additional course work might be required for applicants considering specialized internships. A detailed plan for the completion of all remaining academic requirements must be approved prior to acceptance into the course. Must be taken in conjunction with H ADM 494. S-U grades only, based on six performance evaluations. **Students must be in good academic standing and have a GPA of at least 2.0 in the preceding term.** Elective. R. Chase.

H ADM 494 Management Intern Program II—Academic
Fall and spring. 6 credits. Must be taken in conjunction with H ADM 493. Letter grades only, based on submission of goals and objective statement, four management reports, journals, debriefing, and oral presentation. **Students must be in good academic standing and have a GPA of at least 2.0 in the preceding term.** Elective. R. Chase.

H ADM 495 Implementing Strategies for Tying Wellness Practices to Company Profit
Spring. 3 credits. Limited to 50 juniors, seniors, and graduate students. Elective. M. Tabacchi.
Designed to encourage future managers to evaluate the work environment and to enhance opportunities for diverse worker productivity which should increase the corporation's competitive edge. Emerging fields of complementary and alternative medicines are explored as preventive and cost effective methods of improving workers' health.

H ADM 498–499 Undergraduate Independent Study
Fall and spring. Variable, to 4 credits. Elective. Faculty.
Students are afforded an opportunity to pursue independent study projects under the direction of a resident faculty member. Permission in writing is required prior to course enrollment. Obtain permission form from the Hotel School Student Services Office. Independent study work must be performed in the term for which it is approved, and the usual add/drop policy applies. Retroactive credit for work commenced after an academic term has ended is not allowed.

H ADM 690 Honors Monograph
Year-long course. 4 credits. Limited to professional master's students who: (1) either have a minimum GPA of 3.7 or are in the top 10 percent of the students in the year group in their first-year professional master's courses; (2) have given evidence of being a good writer by meeting all components of the written communication benchmark; and (3) obtained the approval of a brief topic proposal from the potential adviser. Elective. Faculty.
A special integrative course for students who write well and desire to explore in depth a topic of mutual interest to them and a faculty adviser of their choice. The approval of a second reader is required for completion of the course. Special recognition of students who complete the course will be made at graduation. Applications available in the Graduate Office, Room 172 Statler.

H ADM 692 Industry Challenges and Trends
Spring. 3 credits. Limited to 15 seniors and graduate students. Elective. J. Clark.
A seminar approach will be used to discuss readings and case studies selected to illustrate current challenges and future trends such as globalization, consolidation, etc., in the hospitality industry. The view will be futuristic and primarily from that of a multi-unit/corporate perspective. An in-depth analysis of a few specific companies will be included using case studies and guest lecturers when appropriate. Student teams will research new topics and make presentations and final reports.

H ADM 698–699 Graduate Independent Research
Fall and spring. Credit to be arranged. Elective. Faculty.
Student must have in mind a project and obtain agreement from an individual faculty member to oversee and direct the study. Permission in writing is required prior to course enrollment. Obtain permission form from the Hotel School Graduate Office, Room 172, Statler.

H ADM 791 Creating and Managing for Service Excellence
Fall. 3 credits. Professional master's requirement. Limited to MMH students except by written permission of the instructor in advance of pre-enrollment. L. Renaghan.
Covers the complex management practices and concepts necessary to deliver consistent value in the hospitality industry (determining customer expectations; integrating marketing into operations; managing customer satisfaction; and measuring and controlling costs). Cases, lectures, discussion, and industry experts will be used, with emphasis on translating the strategic understanding of value into management practice.

H ADM 793 Industry Mentorship Program
Spring. No credits. S-U grades only. Professional master's requirement. M. Redlin.
Interaction with a senior hospitality industry executive. Objectives are to give the student an overview of the operating dynamics of a segment of the industry, to provide a realistic awareness of day-to-day life working as an executive in the industry, and to develop an awareness of the skills, level of integration, and other factors required for success.

H ADM 794 Management Development
Year-long course. No credits. S-U grades only. Professional master's requirement. N. Dahl, D. Jameson.
All first-year students in the Master of Management in Hospitality program must enroll in H ADM 794 both semesters. This requirement includes participation in the MMH Assessment Center, program benchmarking, team project, and other activities related to students' professional development. Satisfactory completion of the second semester of H ADM 794 documents achievement of all program benchmarks.

H ADM 890 M.S. Thesis Research
Fall and spring. Credit to be arranged.

H ADM 990 Ph.D. Thesis Research
Fall and spring. Credit to be arranged.

FACULTY ROSTER

Alvarez, Roy, M.Ed., Auburn U. Senior Lecturer
Arbel, Avner, Ph.D., New York U. Prof.
Berger, Florence, Ph.D., Cornell U. Prof.
Brownell, Judith, Ph.D., Syracuse U. Prof.
Bryson, Susan, M.A., U. of Chicago. Lecturer
Butler, David W., Ph.D., U. of Wisconsin-Madison. Dean.
Canina, Linda, Ph.D., New York U. Asst. Prof.
Carvell, Steven A., Ph.D., SUNY Binghamton. Assoc. Prof.
Chase, Robert M., M.B.A., Cornell U. Prof.
Clark, John J., Jr., Ph.D., Cornell U. Prof.
Clark, Preston, M.S., Syracuse U. Lecturer
Cullen, Thomas, Ph.D., Cornell U. Assoc. Prof. and Assoc. Dean for Industry and International Affairs
Curtis, Steven, B.L.A., Syracuse U. Lecturer
Dahl, Nicholas, M.A., Oregon State U. Lecturer
D'Aprix, David, B.A., Union College. Lecturer
deRoos, Jan A., Ph.D., Cornell U. Hospitality Valuation Services Professor of Hotel Finance and Real Estate.
Dev, Chekitan S., Ph.D., Virginia Polytechnic. Assoc. Prof.
Dittman, David A., Ph.D., Ohio State U. Herbert E. Westfall Professor of Accounting

Enz, Cathy A., Ph.D., Ohio State U. Prof. and Lewis G. Schaeneman, Jr. Professor of Innovation and Dynamic Management and Executive Director, Center for Hospitality Research
Ferguson, Dennis H., Ph.D., Cornell U. Assoc. Prof.
Geller, A. Neal, Ph.D., Syracuse U. Robert A. Beck Prof. of Hospitality Financial Management
Gould, Shelly, B.S., Cornell U. Teaching Support Specialist
Hinkin, Timothy, Ph.D., U. of Florida. Prof. and Director of Undergraduate Studies
Jameson, Daphne A., Ph.D., U. of Illinois. Assoc. Prof. and Richard J. and Monene Bradley Director of Graduate Studies
Jones, Scott L., M.A., Purdue U. Lecturer
Kimes, Sheryl E., Ph.D., U. of Texas. Prof.
Lang, Barbara, B.S., Cornell U. Lecturer
Lundberg, Craig C., Ph.D., Cornell U. Blanchard Professor of Human-Resources Management
Lynn, Wm. Michael, Ph.D., Ohio State U. Assoc. Prof.
McCarthy, Reneta, B.S., Cornell U. Lecturer
Moore, Richard G., M.B.A., Cornell U. Assoc. Prof.
Mutkoski, Stephen A., Ph.D., Cornell U. Banfi Vintners Professor of Wine Education and Management
Nash, Abby, B.A., Cornell U. Lecturer
Noden, Malcolm A., Senior Lecturer
Norkus, Gregory X., M.S., Cornell U. Senior Lecturer
O'Connor, Therese A., M.S., Elmira College. Senior Lecturer
Penner, Richard H., M.S., Cornell U. Prof.
Pezzotti, Giuseppe G. B., M.P.S., Cornell U. Senior Lecturer
Piccoli, Gabriele, Ph.D., Louisiana State U. Asst. Prof.
Potter, Gordon S., Ph.D., U. of Wisconsin-Madison. Assoc. Prof.
Quan, Daniel W. C., Ph.D., UC at Berkeley. Assoc. Prof.
Redlin, Michael H., Ph.D., Cornell U. Prof.
Renaghan, Leo M., Ph.D., Pennsylvania State U. Assoc. Dean for Academic Affairs
Reynolds, Dennis, Ph.D., Cornell U. Asst. Prof.
Ridley, Jane S., B.A., SUNY at Binghamton. Teaching Support Specialist
Roberts, Elizabeth, Ph.D., Purdue U. Senior Lecturer
Robson, Stephani, M.S., Cornell U. Lecturer
Sherwyn, David, J.D., Cornell U. Asst. Prof.
Siguaw, Judy, D.B.A., Louisiana Technical U. Assoc. Prof.
Simons, Tony L., Ph.D., Northwestern U. Assoc. Prof.
Sinha, Praveen, Ph.D., Carnegie Mellon U. Assoc. Prof.
Snow, Craig, Ph.D., Purdue U. Senior Lecturer
Spies, Rupert, Studienassessor, Senior Lecturer
Steinacher, Richard, Ph.D., Florida State U. Senior Lecturer
Stipanuk, David M., M.S., U. of Wisconsin. Assoc. Prof.
Sturman, Michael, Ph.D., Cornell U. Assoc. Prof.
Susskind, Alex, Ph.D., Michigan State U. Asst. Prof.
Tabacchi, Mary H., Ph.D., Purdue U. Assoc. Prof.
Talbert, Mark, M.P.S., Cornell U. Lecturer
Thompson, Gary M., Ph.D., Florida State U. Assoc. Prof.
Tracey, J. Bruce, Ph.D., SUNY Albany. Assoc. Prof.
Walsh, Kate, Ph.D., Boston College. Asst. Prof.
White, Robert, A.O.S., Culinary Institute of America. Teaching Support Specialist

COLLEGE OF HUMAN ECOLOGY

ADMINISTRATION

Patsy M. Brannon, dean

D. Merrill Ewert; director of Cornell Cooperative Extension

Jennifer Gerner, associate dean

S. Kay Obendorf, associate dean

Brenda Bricker, director, undergraduate affairs

Teresa DiMagno, director, student and career services

Darryl Scott, director, admissions

Duncan Bell, college registrar

COLLEGE FOCUS

The College of Human Ecology anticipates and responds to human needs in the areas of nutrition and health, economic and social well-being, environmental design and technology; as well as human development through education, basic and applied research, and the extension of knowledge. The college is distinctively characterized by the quality of its research in the natural and social sciences and the design arts, a global perspective in academic programs, a preventive approach to contemporary societal problems, multidisciplinary departments and programs, development of leadership in students and citizens, and a commitment to diverse populations. Faculty and students examine individuals in relation to their family, neighborhood, workplace, and community, seeking a balance between theory and practice that will improve the quality of everyday life.

FACILITIES

The college is housed in Savage, Kinzelberg, and Martha Van Rensselaer Halls. The buildings include administrative and faculty offices, classrooms, auditoriums, galleries, and lecture halls; wet chemistry and biochemistry laboratories for nutrition, food science, and textile science; experimental food laboratories; design studios and computer-aided design laboratories; woodworking shops; experimental observation rooms with one-way vision screens and sound-recording equipment; human factors and infant research facilities; educational television studios; and an audio/visual classroom for distance learning. Also included are learning resource centers for career planning, field and international study, a historical costume collection, a human metabolic research unit, an animal research facility, cold rooms, a constant temperature and humidity laboratory, and an early childhood research and care program.

Specialized equipment for teaching and research includes biochemical and chemical instruments for spectroscopy, chromatography, radioisotope analysis, electrophoresis, microscopy, and ultracentrifugation; physical testing equipment; and cameras, videotape, and sound recording equipment.

DEGREE PROGRAMS

Cornell programs in Human Ecology lead to the degrees of Bachelor of Science (B.S.), Master of Arts (M.A.), Master of Science (M.S.), Master of Professional Studies in Human Ecology (M.P.S.), Master of Health Services Administration (M.H.A.), and Doctor of Philosophy (Ph.D.).

General academic information concerning the Bachelor of Science degree is given here under the heading "Undergraduate Study." Curricula for major studies are described under the various academic areas.

Programs leading to master and doctoral degrees are administered by the Graduate School. They are described in the *Announcement of the Graduate School* and in announcements published by the individual field offices (Design and Environmental Analysis, Human Development, Nutrition, Policy Analysis and Management, and Textiles and Apparel). For information regarding The Sloan Program in Health Services Administration, contact the Department of Policy Analysis and Management.

UNDERGRADUATE DEGREES

Bachelor of Science (B.S.) degrees are offered in the following areas:

Biology and Society

Design and Environmental Analysis

Human Development

Human Biology, Health, and Society

Nutritional Sciences

Policy Analysis and Management

Textiles and Apparel

Individual Curriculum

UNDERGRADUATE AFFAIRS

Persons interested in undergraduate study in human ecology should contact the admissions office, 170 Martha Van Rensselaer Hall (255–5471). Those interested in graduate study should contact the graduate field representative identified among the faculty of each department. Department faculty are listed at the beginning of the course descriptions for each department.

Counselors in the Office of Admission, Student, and Career Services (172 MVR) can help perspective students understand college programs and requirements, as well as college and university resources and services. They provide a broad range of career services and personal support for all matriculated undergraduates. The college registrar (145 MVR) assists undergraduates with questions about academic credit and graduation requirements.

The Student Body

The College of Human Ecology undergraduate enrollment is 1,395. Roughly 390 students graduate each year; last year 250 freshmen and 195 transfer students matriculated. Ninety-five faculty members serve as advisers to undergraduates.

The college's undergraduate admissions committee selects applicants who are academically well prepared and appear most likely to profit from the college's various curricula. Admission is highly selective. Approximately two-thirds of the student body comes from New York State, with the remainder coming from other parts of the United States and abroad. In 2000, 28 percent were identified as members of minority groups. Approximately 212 graduate students have members of the college's faculty chairing their special committees. The college awarded 44 master's degrees and 34 doctorates last year.

Mature Students

The college recognizes that students who interrupted their formal education and are returning to school have needs different from those of younger undergraduates. To facilitate the education of mature students, defined as those 24 years old or older at first matriculation, the college has adopted certain procedures specifically for that group. Counselors in the Office of Admission, Student, and Career Services (172 MVR) can provide information of interest to mature students. Mature students are permitted to enroll for as few as six credits without petitioning for permission and also are permitted to extend their residency beyond the normal eight terms. To find out about qualifying for prorated tuition, mature students must see the registrar before registration each semester.

Special Students

Students eligible for special status are those visiting from other institutions and interested in particular programs in the college, those with a bachelor's degree who are preparing for graduate study or jobs and careers in human ecology–related fields, or those who have interrupted their education and are considering completing degree programs. Students accepted in the nondegree status of special student may enroll for a maximum of two semesters. During the second semester of attendance, a special student must either apply for admission as a transfer student or plan to terminate studies in the college at the end of the semester. Special students are expected to take a minimum of 12 credits each semester and to take one-half to two-thirds of their work in the statutory divisions of the university. Courses taken while a person is classified as a special student may be counted toward the requirements of the

bachelor's degree. Those interested in becoming special students should make appointments to discuss admissions procedures in the Office of Admission (170 MVR, 255–5471).

Empire State Students

Occasionally a student who is completing requirements for a degree through the Empire State College Program is interested in taking a human ecology course. This can be done by registering through the Division of Summer Session, Extramural Study, and Related Programs (B20 Day Hall, 255–4987). All rules of the extramural division apply, and registrations will be accepted only on a space-available basis and with the written approval of the course instructor. At the time of registration, Empire State College students must provide the extramural division with a completed copy of Empire State College's notification of cross-registration (form number, SA-22, F-031) to verify enrollment in Empire State College. Such students will be charged 25 percent of the standard extramural tuition per credit.

Transfer students

Students who enter the College of Human Ecology after the first semester of their freshman year are considered transfer students. An internal transfer student is one who transfers to Human Ecology from one of the other colleges at Cornell University. An external transfer student is one who transfers to Human Ecology from an institution outside of Cornell University. Internal transfer students should take special care to learn the policies of Human Ecology because each college at Cornell operates under a different set of rules. Staff in the Office of the College Registrar (145 MVR, 255–2235) and in the Office of Admission, Student, and Career Services (172 MVR, 255–5471) are available to answer students' questions. External transfer students may transfer a maximum of 60 credits to the college after admission. Both internal and external transfer students should contact the Office of the College Registrar to discuss how the transfer credits will apply to the various degree programs.

MAJORS

The college requires students to fulfill requirements for a major in order to graduate. Students must declare a major by the end of the sophomore year, and may elect to complete more than one College of Human Ecology major. It is common for students to change interests during their undergraduate careers. Counselors in the Office of Admission, Student, and Career Services (172 MVR) and directors of undergraduate study in each of the academic departments can help students to consider their options and engage in academic planning. All changes of major require submission of the Change of Major form, and are processed through the College Registrar's office, 145 MVR. Change of major will trigger re-evaluation of credit and assignment of a new faculty adviser.

DESIGN AND ENVIRONMENTAL ANALYSIS

The Department of Design and Environmental Analysis (DEA) is concerned with planning, designing, and managing interior environments to satisfy human needs. Most people spend over 90 percent of their lives inside buildings. Those settings have substantial and far-reaching effects on the quality of our lives. The processes for creating and maintaining the built environment face enormous challenges, including frequent social and organizational changes, technological advances, new building methods, and finite resources. The program in DEA is dedicated to preparing professionals who can meet these challenges.

Diverse faculty backgrounds and teaching approaches help students to develop multidisciplinary problem-solving and creative abilities, aesthetic judgment, and analytical thinking. Excellent laboratory, shop, studio, and computer facilities permit exploration of innovative concepts for the design and management of interior environments. The relationship between people and their physical surroundings is explored through a combination of academic courses, field experience, and applied research. Examples of student class projects and faculty work are frequently on display in the MVR gallery. The DEA Resource Center includes books, journals, newsletters, and material samples for student use.

Options

The department offers undergraduate education in three professional areas: interior design, facility planning and management, and human factors and ergonomics. The interior design option is accredited by the Foundation for Interior Design Education Research (FIDER). The Facilty Planning and Management Program at Cornell is an "IFMA Recognized Program." This means that it meets the standards for recognition of programs established by the International Facility Management Association.

To take full advantage of the course sequences and electives, it is important to select an option as early as possible. This is particularly true in the interior design option. Transfer students in the interior design option may need one or two extra semesters to complete the program.

Option I: Interior Design

The interior design option prepares students for professional careers in the planning and design of interior spaces and associated products. The program emphasizes a problem-solving approach based on knowledge of buildings and their associated systems, furnishings and interior products, human-environment relations, and design principles. Some students combine this program with another option.

Careers are available in interior design and space planning, interior architecture, facility planning, interior product design, and housing. This program also serves as an excellent preparation for graduate study in interior design, facility management, architecture, and product design.

Option II: Facility Planning and Management

This option is designed to prepare students for professional careers in facility management. The program focuses on the planning, design, and management of facilities for large, complex organizations such as corporations, health-care institutions, research and development laboratories, and universities. Facility planning and management is a basic management function that coordinates and integrates information and expertise from areas such as planning and design, real estate, and business administration with human factors, ergonomics, environmental psychology, telecommunications, and building operations for the purpose of developing and managing facilities that support individual and organizational effectiveness.

Excellent career opportunities exist in the facility management divisions of private companies, institutions, the health-care industry, and with private consulting firms offering facility management services. The program is also a good preparation for graduate study in business, planning, or one of the design disciplines and for advanced study in facility planning and management.

Option III: Human Factors and Ergonomics

Human factors and ergonomics focuses on the interaction between people and their physical surroundings. This option seeks to expand understanding of how the environment affects human perception, cognition, motivation, performance, health, safety, and social behavior. This knowledge is then used to help architects, planners, interior and product designers, and facility managers to plan, design, and manage safe and effective environments. The effect of human capabilities or characteristics such as family structure, life-style, social class, and stage-in-life cycle on environmental needs and requirements is also a focus of the program. Career opportunities are available in design firms and in urban planning and other public agencies as well as in the facility management and product design division of private companies. Human factors and ergonomics is good preparation for graduate study leading to a Ph.D. degree in the social sciences and a career in academic or other research-oriented settings in either the public or private sector. It can also serve as the basis for graduate study in an environmental planning or design discipline such as architecture, facility planning and management, interior design, landscape architecture, or city and regional planning. Electives in the social sciences and in research methods and statistics are encouraged.

Academic Advising

All DEA majors are matched with a faculty adviser during their first semester by the director of undergraduate studies, William Sims, in E214 Martha Van Rensselaer Hall.

Consultation with faculty advisers about future goals, departmental requirements, sequences of courses, and electives inside or outside the college helps students develop their programs. Students majoring in interior design, especially, must begin early to plan and collect materials for a portfolio of their work, which is necessary for many positions and for application to graduate schools. Faculty advisers can make recommendations on what to include. Students are free to change advisers. Although advisers must sign the

schedule card during course enrollment each term, it is the student's responsibility to keep track of his or her courses and to make sure that they meet graduation requirements for their major and college.

Ownership and Exhibition of Student Work

All design work dóne in studios as part of an academic program is the property of the department until it has been released by the instructor. The department is not responsible for loss or theft of student work.

HUMAN BIOLOGY, HEALTH, AND SOCIETY

The Human Biology, Health, and Society (HBHS) Program permits you to combine your interests in the biological sciences while exploring human health issues from the perspectives of both the biological and behavioral sciences. HBHS majors select the issues they want to explore in depth from Human Ecology courses that address health and the broad range of factors that influence human well-being. Examples of issues you can explore include: biology and behavior; metabolism, genetics, and health; biology, growth, and development; and food and health policy and health promotion. Most students in this program will proceed to programs of advanced study to pursue careers related to health. This major is offered by faculty in the Division of Nutritional Sciences. More information about this program can be found in a separate section of the catalog that describes the division's programs.

HUMAN DEVELOPMENT

Human Development majors explore the psychological, social, cultural, and biological development of people from conception to old age, focusing on the processes and mechanisms of growth and change over the life course. A wide range of issues are included in the study of human development, including biological, cognitive, and emotional development; the role of family, neighborhood, workplace, and culture in development; and the influence that developing humans have on their environment. The Human Development major provides an excellent foundation for many careers, such as medicine (particularly family medicine, pediatrics, and psychiatry), clinical psychology and other mental health professions, law, business (especially human resources), child and family advocacy, and education (from preschool and elementary school teaching to school administration). The major prepares students for academic careers as professors in human development, psychology, or sociology departments. Learning about human development also helps students understand more clearly their own development and the development of those around them.

The faculty of the Department of Human Development comes from several disciplines, including developmental and clinical psychology, sociology, and history. The diversity of faculty expertise results in a wide-ranging view of human development. The research of the department's faculty is extensive. It includes basic research on issues such as the neurobiology of personality, the role of childhood attachments in the development of adult romantic relationships, the acquisition of language in infants, and the effects of environmental toxins on children's cognitive development. It also includes applied research useful for the creation of public policy, such as studies of the causes and consequences of child maltreatment and studies of the effectiveness of reading programs for Headstart preschoolers, apprenticeship programs for high school students, and support programs for older adults moving into retirement communities.

Curriculum

Human Development is the most flexible major in the College of Human Ecology. While all students learn the fundamentals of human development, each student can focus on one or more areas of particular interest. The flexibility of the major also allows students ample opportunity to meet the requirements for admission to many professional schools, including medical, dental, law, and business schools.

Requirements specified by the College of Human Ecology make up part of each student's curriculum, and include classes in the social and natural sciences, humanities, writing, and communication. In addition, there are requirements for the Human Development major. Students in this major can choose up to 14 elective courses from the broad range of offerings across the Cornell campus.

Special Opportunities

Beyond formal coursework, students have many other opportunities that involve ongoing individual work with Cornell faculty or other professionals. Academic credit can be earned through all of them. These opportunities include the following:

Field Placements. Human Development majors can arrange internships with Urban Semester in New York City, Cornell-in-Washington, and Cornell Abroad programs and in local agencies. These have included hospitals, psychiatric hospitals, juvenile detention centers, retirement homes, and the department's on-campus Early Childhood Program. Students have also participated in projects with the Tompkins County Office of Aging, the Tompkins County Youth Bureau, and the Law Guardian's Office of Tompkins County.

Faculty Research. Many students work as research assistants on faculty projects. Students use research techniques ranging from laboratory procedures to family observations to large surveys. They assist in study design, data collection, and data analysis. Participation in faculty research provides the type of experience that many graduate and professional schools expect from their top applicants. Recent projects have included the study of parent-infant interactions, the transition of high school students into the world of work, and the study of recent trends in the composition of American families.

Independent Research. Under faculty supervision, some advanced students complete an honors thesis in an area of personal interest by designing a study and collecting and analyzing data. Recent thesis topics have included marital quality in Asian and interracial couples, development in families that adopt school-age children, and connections between speed of visual processing in infants and later scores on intelligence tests.

Undergraduate Teaching Assistant. Advanced students can serve as undergraduate teaching assistants. This requires close work with the professor teaching the course as well as with students taking the course.

Teaching Certification. A cooperative education program exists between Human Development and Wells College. This program requires careful planning and course scheduling. It enables students to graduate with a Cornell Bachelor's Degree and New York State Certification to teach nursery school through sixth grade. This certification is honored by most other states.

The program requires a minimum of a three-semester commitment. Cornell HD students take four courses at Wells College and student teach their last semester at Cornell. Although there is van transportation between Cornell and Wells College, it is important for students to have access to a car, especially while student teaching. Students will be registered at Cornell during the entire undergraduate program and usually maintain Ithaca housing. Wells College courses count as Cornell courses and are used as electives, but do not get included in a student's GPA. The one-semester student teaching experience is typically based in the Ithaca area, though not necessarily within the City of Ithaca.

This program is open to HD majors only. You must have at least a 3.0 Cornell cumulative GPA upon application, and must maintain a 3.0 GPA to qualify for student teaching and to complete the program. For more information, contact Judith Ross-Bernstein in G56 MVR at 255–0826.

NUTRITIONAL SCIENCES

A major of Nutritional Sciences (NS) focuses on the complex interrelationships of food patterns, nutritional status, and health. This field draws upon chemistry, biology, and the social sciences to understand questions such as: How are nutrients used by the body? What factors influence human food choice? What nutrients and dietary patterns are recommended to promote growth, maintain health, or reduce the risk of chronic disease? Students in this program may also fulfill the courses required for professional membership in the American Dietetic Association, which will enable them to be employed as nutrition counselors, clinical nutritionists, sports nutritionists, or administrators of food and nutrition services. Students also may prepare for medical school and other types of advanced degree programs through this major. The requirements for this program are outlined in the section of this catalog that describes the division's programs.

Special Opportunities

Dietetics and Clinical Nutrition

Interested students should complete the academic requirements for the American Dietetic Association (ADA). Courses in foods, nutrition and disease, microbiology, management, statistics, and economics are added to the core curriculum (specific requirements). Evaluation of academic credentials for active

membership and registration in ADA should be completed before graduation. Seniors should initiate this academic evaluation process in March if they will graduate in January or in September if they will graduate in May. All students who will complete the academic requirements by graduation should participate in the evaluation process while at Cornell. Students who meet most but not all of the academic requirements are encouraged to have their academic work evaluated while they are at Cornell so that deficiencies can be identified and documented.

Advisers in the dietetics program can also help students plan to meet the experience or supervised practice component required for active membership and/or eligibility to take the Registration Examination to be certified as a registered dietitian (R.D.). For additional information about meeting ADA requirements, contact Marie Kamp (373 MVR, 255–2638).

Exercise Science Minor

Students can complete the Applied Exercise Science Concentration at Ithaca College, which includes courses in fitness measurements, exercise physiology, and biomechanics of human movement. Nutrition courses of special interest relate to growth and development, regulation of body weight, and community nutrition and health. For information about the Applied Exercise Science Concentration, contact the DNS Academic Affairs Office (309 MVR, 255–4410).

POLICY ANALYSIS AND MANAGEMENT

The Policy Analysis and Management (PAM) major produces graduates skilled in policy analysis, program planning, and evaluation and possessing management skills applicable in the public, nonprofit, and private sectors. In addition, the Policy Analysis and Management graduate will have concentrated knowledge in one of three areas: family/social welfare, health, and consumer policy. Graduates are well-qualified for a wide variety of public, nonprofit, and private sector employment emphasizing either program analysis and evaluation or management. The major also attracts large numbers of pre-law students, pre-MBA students, and students intending to pursue graduate education in public affairs and policy analysis programs. The potential exists to pursue a five-year program resulting in a BS and a Master of Health Administration.

The PAM major combines theoretical underpinnings from economics, sociology, psychology, and government to critique and analyze our society's values, laws, policies, and programs. It also gives students the knowledge to build management skills for use in public, nonprofit, and for-profit settings. Ideas of social justice, equity, and efficiency will be studied concurrently with strategic planning, human resources, supervision, and organizational development. Research methods, statistics, and planning and evaluation concepts will be learned and used to direct and aid in program planning, policy analysis, program evaluation, and management.

In addition to learning basic policy analysis and management skills, the student will be expected to apply these skills to a particular concentration—social welfare/family, health, or consumer policy. Social welfare/family policy and management includes a panoply of governmental and private sector income maintenance, social, and human service delivery programs and policies that range from child adoption, neglect, and abuse policies and antipoverty programs to policies and programs that impinge on or regulate marriage, divorce, and fertility. Health programs and policies include such politically sensitive programs and issues as health care access, Medicare, Medicaid, long-term care, health maintenance organizations, public health issues, and substance abuse policies. Consumer programs and policies include the regulation and laws governing advertising, product safety, food and drug safety, nutrition policies, the regulation of credit, insurance, telecommunications, mortgage, housing, and public utility markets and also deal with issues such as the invasion of privacy, Internet security, and children's television. A specific focus in the consumer concentration is the role of marketing and its relationship to consumer well-being and consumer behavior.

In addition to college requirements, all PAM majors are expected to take core courses: Introduction to Management, Introduction to Policy Analysis, Research Methods, Multivariate Statistics, Intermediate Microeconomics, and Public Finance. Students will also be expected to develop a concentration of three courses in either social welfare/family, health, or consumer policy. These concentrations may emphasize either policy analysis or management skills. Finally, PAM majors are encouraged to participate in experiential learning such as Cornell in Washington, the Capital Semester, or Urban Semester. Please check with the undergraduate advising coordinator, Professor Alan Mathios, for further details.

TEXTILES AND APPAREL

The Department of Textiles and Apparel (TXA) focuses on the use of textiles and fibrous materials for apparel, durable and nondurable household goods, composites, geotechnical, and biomedical applications. Programs in the department, in keeping with the overall mission of the college, emphasize the use of materials to meet human needs. The curriculum includes the application of design principles, physical and materials science, economics and marketing, government policy/regulation, management of products and their delivery, and technological developments.

Practical problem-solving skills are developed in the department's laboratories and studios. Academic course work is further enhanced by field and international experiences. Gallery space provides the setting to display design work. In addition, the Cornell University Costume Collection, housed in the department, provides a valuable resource; items from the collection are made available to students for classroom and special study use.

Academic Advising

All TXA majors are matched with a faculty adviser by the director of undergraduate studies, Anita Racine (316 MVR). Students are strongly urged to discuss their goals, course selection and sequence, electives, and career plans with their faculty adviser. Students in apparel design must begin working with their advisers early to develop a professional portfolio of their work. Students are free to change advisers; changes must be recorded with the advising coordinator. Although advisers must sign the schedule card during course enrollment each term, it is the student's responsibility to keep track of his or her courses and to make sure that the program meets graduation requirements for their major and college.

Ownership and Exhibition of Student Work

All apparel design work done as part of the academic program is the property of the department until it has been released by the instructor. Certain exceptional work may be retained by the department to exhibit for academic purposes. The department is not responsible for the loss or theft of student work.

Course Fees

No grade will be given in a course unless the course fee has been paid by the last week of classes.

Options

Students may select options in apparel design, apparel/textile management, or fiber science. The curriculum is based on manipulation of form, color, and the physical characteristics and structures of fabric to solve functional and aesthetic apparel problems; the application of economic and marketing principles to consumer and industry problems in the textile-apparel sector; and the study of chemical, physical, and engineering properties of fibrous structures and polymers. Depending on previous course work, transfer students may need one or two extra semesters to fulfill the requirements of the major.

Option I: Apparel Design

The study of apparel design includes both aesthetic and functional considerations in the design of body coverings. The program emphasizes a problem-solving approach that enables the student to bring a background in apparel, textiles, and human factors to the design process.

Option II: Apparel/Textile Management

Apparel and textile management combines the fields of apparel and textiles with those of economics, business management, and organizational policy. Students combine theory with case studies to find solutions to everyday problems. Course work is drawn from many interrelated disciplines, including textiles, apparel, economics, business management, and communication, as well as practical field experiences. This provides students with the experience of working with professionals from a wide variety of disciplines. Students often combine this option with either Option I (Apparel Design) or III (Fiber Science).

Option III: Fiber Science

Applications for textile structures include advanced engineering composites, protective clothing for industrial and military environments, and biomedical materials, as well as the more traditional applications found in apparel and home furnishings. The fiber

science option provides a strong base in mathematics and the physical sciences combined with supporting courses in engineering, consumer economics, and the social sciences.

Career Opportunities

Graduates of programs in the Department of Textiles and Apparel have found challenging employment within the textile and apparel sector, in independent and government-sponsored research, and in community organizations. Recent graduates are working in the fields of design, management, new product development, engineering, communications, and marketing. In addition, the program prepares students for graduate or professional study in fiber and polymer science, textile marketing, apparel design, textiles, or business and management.

INTERDEPARTMENTAL MAJOR IN BIOLOGY AND SOCIETY

Biology and Society is a multidisciplinary program for students with special interests in such problems as genetic engineering, environmental quality, food and population, the right to medical care, and the relation between biology, society, and ethics and/or public policy. It is also designed for students who plan postgraduate study in management, health, medicine, law, or other related fields.

Because the biology and society major is multidisciplinary, students must attain a basic understanding of each of the several disciplines it comprises, by including courses in the fields of mathematics, biology, humanities, and social sciences. In addition, majors are required to take core courses in biology and society, a set of electives, and a special senior seminar.

Course work in the College of Human Ecology may be selected from concentrations in: human development and the environment, health, or social policy and human services. The other basic requirements of the college must also be met. Programs incorporating those required courses are designed in consultation with a faculty adviser to accommodate each student's individual goals and interests. For further information on the major, including courses of related interest, specific course requirements, and application procedures, see the Director of Undergraduate Studies in MVR 205.

INDIVIDUAL CURRICULUM

A student who has educational and professional objectives that cannot be met satisfactorily within the framework of existing majors in the College of Human Ecology may petition to develop an individual curriculum. To be approved, the curriculum must be within the focus of the college and be interdisciplinary in design, include at least 40 credits in human ecology courses, and not exceed the normal number of credits allowed in the endowed divisions. A student develops an individual curriculum in consultation with faculty advisers from at least two subject-matter fields and the program coordinator, Patti Papapietro, Office of Admission, Student and Career Services (172 MVR).

Such a program of study should encompass a substantial part of the student's undergraduate education and must include at least three semesters. For this reason, a request to follow an individual curriculum should be made after the freshman year and must be made before the second semester of the junior year.

If an individual curriculum seems advisable, the individual curriculum coordinator will provide direction in formally developing a program of study. Although the coordinator must approve the course enrollment schedule during course enrollment each term, it is a student's responsibility to follow the curriculum as planned or to have any necessary revision approved in writing by his or her adviser and the program coordinator before the program change.

SPECIAL OPPORTUNITIES

Several programs allow students to receive academic credit for fieldwork and internship experience, study abroad, study in absentia, college-wide certificate programs, and joint programs with other schools and colleges at Cornell. Students may petition the college registrar to have concentrations that are formally recognized elsewhere within the university noted on their transcripts when accompanied by appropriate documentation from the program.

Study Abroad

Each year nearly 100 Human Ecology students spend a semester or more off campus in places spanning the globe, such as Australia and Zaire. There they supplement their Cornell studies with a wide range of cross-cultural and academic experiences. Study abroad opportunities are available through Cornell Abroad, U.S. college-sponsored programs abroad, and individual applications at foreign universities.

All study abroad students must meet college study abroad requirements and remain registered at Cornell during the overseas study. Credits earned count towards the 60 Cornell credits required for graduation. Study abroad credits do not count toward the maximum number of endowed credits that Human Ecology students are permitted to earn. Typically, students considering study abroad begin their planning at least by September or October of their sophomore year.

To start:

- Carefully consider what it is you hope to get out of a study abroad experience (academically and culturally). The Cornell Abroad Center (474 Uris Hall) houses the largest on-campus collection of materials on programs around the world. The Human Ecology Career Development Center (159 MVR) has additional materials.
- Pick up an application from the Office of the Registrar (145 MVR).
- Meet with the college's study abroad adviser (172 MVR). The adviser, with the college registrar, will help you complete the application, plan for your semester off campus, and secure the necessary signatures.
- Submit your application to the Office of the Registrar. Deadlines are early February for study abroad the following fall term, and early September for study abroad the following spring term. Please note that some programs fill up quickly and applications to these most popular programs should be submitted several months before these deadlines.

Independent Research

Research opportunities for undergraduates are extensive and valued as an important part of the learning experience. The opportunity to engage in substantive research with some of the leading scientists in their fields is so compelling that approximately half of the college's undergraduates conduct research projects. Students may become involved in research with the guidance of faculty members by conducting research assigned in a class, joining a faculty member's research group, completing an independent study research project, or carrying out an honors program project.

For further information, contact individual faculty members or the director of undergraduate studies (DUS) in your department.

Honors Programs

Students interested in college honors programs that lead to the degree "bachelor of science with honors" usually apply to the appropriate honors committee no later than the end of their sophomore year. Generally, a minimum grade point average of 3.3 and demonstrated potential for honors-level research is required. Students take approved courses in research methodology and evaluation, attend honors seminars, complete a written thesis, and defend it in an oral examination.

In addition to the college honors program, special programs are offered by the Department of Human Development and the Division of Nutritional Sciences.

If you are interested in the honors program, it is important to contact the director of undergraduate studies (DUS) in your department or division for information and guidelines.

Field Study and Internships

Field study and internships provide experiential learning opportunities in real-life circumstances where classroom knowledge is tested and applied. Students are able to master new skills, develop and implement plans of action, solve problems, interact in multicultural situations, and build networks for future job opportunities. By applying techniques of research methods, critical thinking, and self-directed learning, students learn to think conceptually while becoming agents of change.

Check with the Director of Undergraduate Studies for major specific information. The Career Development Center (159 MVR) can also provide resources and assistance in finding internships and other experiential opportunities.

Concentration/Certificate in Gerontology

For students interested in pursuing study related to aging, the College of Human Ecology, under the auspices of the

Bronfenbrenner Life Course Center, offers the option of completing an undergraduate concentration in gerontology. This program is designed to develop an understanding of and competence in dealing with the processes and issues of aging. Study in gerontology enriches the practical experience of students and prepares them for professional work in this area. The program draws on the resources of several departments and colleges at Cornell and Ithaca College to shape a curriculum suited to each student's professional goals and interests.

The concentration is available in combination with any major offered by the university. Twelve credit hours of course work must be completed with nine of these taken in the College of Human Ecology. The courses explore aging through biology, psychology, sociology, economics, and design.

Experiential learning opportunities are strongly recommended as a complement to classroom work. With faculty sponsorship, students can participate in experiences in the Ithaca area, the Urban Semester in New York City, Cornell-in-Washington, the Capitol Semester, or in a placement arranged more individually.

Both Cornell and Ithaca College offer courses that incorporate a service-learning component into their curriculum. Cornell's course, "Housing for the Elderly," (PAM 375) has placements in a variety of local agencies (e.g., Office of Aging, Housing Authority, Ithacare) where students gain valuable experience with the different ways communities make it possible for adults to remain independent. This course and others at Ithaca College are sponsored by the Ithaca Partnership for Service Learning in Elder Care. They offer a variety of options for combining volunteer service with classroom experiences. Opportunities for undergraduates to become involved in research projects, such as the Pathways to Life Quality Study, a new Cornell University/ Ithaca College longitudinal study of residential changes and adjustments in the later years are also available. In addition, senior students can apply to work as a teaching assistant for a gerontology course.

Departments and programs have designated academic advisers for the gerontology concentration who will help students plan the sequences of courses and electives needed to complete both a major and the gerontology concentration. Because many gerontology courses have prerequisites, early and careful planning is essential.

Specific program requirements may be obtained in the Office of the College Registrar (145 MVR, 255–2235) or from Donna Dempster-McClain, Bronfenbrenner Life Course Center (G20 MVR, 255–5557).

General Concentration

Students may develop a concentration in additional fields taught at Cornell by taking 12 credits in an approved area. Computer science, Africana Studies, Women's Studies, communications, or business are just a few examples of concentrations that are possible.

THE URBAN SEMESTER PROGRAM IN NEW YORK CITY

Multicultural Issues in Urban Affairs

Sam Beck, Ph.D., director

The Urban Semester Program is a set of courses spanning the entire year. Students choose either Fall or Spring semester and enroll in three classes focusing on the opportunities and barriers that a multicultural society presents and their relationship with professional, community, or public policy settings and concerns (15-credit residential program). They also intern three days each week in placements of their choosing. One day each week, students carry out community service in an inner city school (pre-k to high school). One day each week, students participate in site visits. Seminars are incorporated into these activities. All students reside in the Olin Hall dormitory of the Weill Medical College of Cornell University.

The two-week Winter Session course (two credits) enables students to carry out community service through a reflective practice and problem-solving curriculum. In the eight-week summer semester (one to two credits), students carry out internships in placements of their choosing, including a new summer medical program. Students work with the program staff to locate internship placements. For information, contact the Urban Semester Program staff (159 MVR Hall, (607) 255–1846) or the Urban Semester Program in New York City at (212) 746–2273.

New York City offers a wide variety of internship settings. Many bilingual and bicultural internship settings are available in Chinese, Spanish, Creole, Russian, Yiddish, and other languages. Examples of internships follow:

Health and Medicine—New York Presbyterian Hospital/New York Weill Cornell Center, Queens Medical Center for Women and Children, South Bronx Health Center for Children and Families, Memorial Sloan Kettering Hospital, Hospital for Special Surgery, Montifore Hospital, Bellevue Hospital, Our Lady of Mercy Hospital

Private and Public Law— NOW Legal Defense and Education Fund, Agenda for Children Tomorrow, Skadden Arps, Slate, Meagher, & Flom, Lawyers for Children, DA's Office, Legal Aid Society, AALDEF, Committee Against Anti-Asian Violence, Center for Immigrant Rights, NAACPLDEF, Dorsey & Whitney

Government and community agencies—Cornell University Cooperative Extension, Senator Charles Schumer's office, NYC Housing Authority, Dept. of Aging, Women's Action Alliance, NYC Commission on the Status of Women, NYC Dept. of Consumer Affairs, The Center for Puerto Rican Studies, Manhattan Borough President's office, Central Park Wildlife Center, Attorney General's office, The Parks Dept., Health Dept.

Wall Street firms and other private businesses—Bloomingdales, Prudential Securities, Merrill Lynch, Price Waterhouse, Cairns & Associates, Burson Marsteller, Cushman & Wakefield, AIG-AI Underwriters, Smith Barney, Jane Clark Chermayeff Associates, DDB Needham, KCSA, William M. Mercer Consulting Co., MGM, Madison Square Garden, Gensler Architecture, Niedefhoffer-Henkel Century Group, American Management Association

Private not-for-profit organizations—City Lights Youth, Council on Economic Priorities, Planned Parenthood, Talbot Perkins, FEGS, National. Resources Defense Council, Urban Youth Alliance Inc., Phipps Housing, The Door, Covenant House, Global Policy and International Law, UN International Assoc. of Religious Freedom, Mothers and Others for a Livable Planet, UN Child Care Center, WHEDCO, YAI, Families and Work Institute

Private and public schools—Beginning with Children, Banana Kelly High School, East Harlem School at Exodus House, The Hetrick Martin Institute, Nuestros Ninos, Theodore Roosevelt High School, The Choir Academy of Harlem, El Puente, Genesis RFK Center, River East School, MS 118, Mott Haven Village

Design and arts organizations—Harlem Textiles Works, TADA!, NY Theater Workshop, Cynthia Rowley, Inc., Perry Ellis International, Museum of African Art, SOHO20 Gallery, Lower East Side Tenement Museum, Tommy Hilfiger, Polo, The Gap, Liz Claiborne

Communications and media—Nickelodeon, Do Something magazine, NBC "Dateline", CNN, CBS News-"48 Hours", NBC News, ABC "One Life to Live", MSNBC "The News w/ Brian Williams", The Village Voice, Good Housekeeping, The New Yorker, Essence, Children's Television Workshop, Good Morning America, MTV, HarperCollins Publishing, Maxim Magazine, Nickelodien, MTV Online International

Other Off-Campus Programs

Capital Semester

Combine a full semester of Cornell credit with a three-day-a-week paid internship of $3,000. Students intern directly for New York State legislators in Albany to explore their interests in greater depth, doing research projects, meeting with lobbyists and constituents, writing reports for legislation and publication, and working on legislative hearings. This is great experience for law school, graduate school, and employment. It is available for the spring semester only with preference given to juniors.Visit the Career Development Center (159 MVR) for more information and applications.

Cornell-in-Washington

Students take courses from Cornell faculty, conduct individual research projects, and work as externs while taking advantage of the rich resources of the nation's capital. For more information, visit the program office (471 Hollister Hall).

Courses at Ithaca College and Wells College

Full-time undergraduate students at Cornell may petition to enroll in courses at Ithaca or Wells College. Students pay regular full tuition to Cornell and only special fees to either Ithaca or Wells where applicable. Students are allowed to register for one course per term and a maximum of 12 credits in four years. Exceptions will be granted to Cornell students enrolled in methods and practice teaching courses at Ithaca and Wells, and those students pursuing a concentration in exercise science through a specially arranged program with Ithaca College.

Cornell students are eligible to register only for Ithaca and Wells College courses that are relevant to their program and that do not duplicate Cornell courses. Ithaca and Wells College credit counts as Cornell credit, but not as Human Ecology credit. Students are accepted on a space-available basis. Participation in this program is not guaranteed, and both Ithaca and Wells have the right to accept or reject students for any reason deemed appropriate. The program is available only during the fall and spring semesters. For further information, contact the college registrar (145 MVR, 255–2235).

Double-Registration Programs

Five-Year BS/MPS in Health Care Administration

Undergraduates from HBHS and PAM are eligible to apply to the Sloan Program in their junior year for a five-year B.S./M.P.S. degree. During their senior year, students will take first-year Sloan courses which will be counted twice to satisfy both undergraduate as well as graduate requirements. Also during this year, students will complete a graduate school application and take the GRE or GMAT test. At the end of their senior year, students will graduate with a B.S. degree. If the students' grades and test scores are competitive, they will be notified during the spring semester of their senior year that they have been formally accepted into the Sloan Program.

Those students accepted will participate in a health care administration residency during the summer after earning their BS. The following year they will complete the second year of required Sloan courses and earn a Masters in Professional Studies with Cornell certifying completion of requirements in a degree in health administration.

Double-Registration Program for Law

A small number of highly qualified applicants may be admitted to the Cornell Law School after only three years of undergraduate education. The requirements for admission under these circumstances are more stringent than for acceptance after four years of undergraduate study. Applicants must present outstanding qualifications and strong professional motivation. The junior year applicant follows the ordinary application procedures for Cornell Law School admission.

Interested students should contact the Law School director of admissions (Myron Taylor Hall, 255–5141) to discuss the admissions criteria. Because students accepted to this program will be spending their senior year away from Human Ecology, they need to plan ahead to ensure that distribution requirements for the BS degree will be met. Successful applicants need the approval of the college registrar in Human Ecology.

ACADEMIC ADVISING AND STUDENT SERVICES

Faculty Advisers

Students who choose to major in a particular department are assigned an adviser whose special interests match their need. Students may change advisers as their own interests change by working with the director of undergraduate studies (DUS).

Faculty advisers are available to discuss course requirements and sequences, useful electives inside or outside the college, as well as future goals and career opportunities. Although advisers must provide the adviser key number (PIN) during course enrollment each term, it is the student's responsibility to make sure that his or her program meets graduation requirements for the major and the college. Directors of undergraduate studies in each department are available to answer questions about the advising system and the undergraduate major. Students who are exploring alternative majors should work closely with college counselors.

Office of Admission, Student, and Career Services

The Office of Admission, Student, and Career Services (ASCS) (172 MVR) is a center for student orientation activities; academic, personal, and career advising; study abroad; and minority student programs.

Personal counseling, including exploration of problems or concerns of a personal nature, is available to all students. These ASCS counselors, however, are not psychiatrists or therapists; they are available to help you understand and navigate the Cornell system, and to offer support, assistance, and referral. Discussions are completely confidential. Appointments may be made through the receptionist in ASCS or by calling 255–2532.

In addition, ASCS provides support for several student organizations, including Human Ecology Ambassadors, the Mature Students Association, the Association for Students of Color, the Pre-professional Association towards Careers in Health, the Pre-law Undergraduate Society, the Orientation Committee, and Human Ecology Voices. Primary responsibilities of the office are listed below:

Academic advisement. This service is provided to all students as an adjunct to faculty advising. Counselors can assist in course scheduling, academic planning, selection of a major, graduation requirements, and related issues.

Undeclared majors. Students who have not yet declared a major are urged to work closely with student services staff to plan their program of study. For the period a student is undeclared, counselors will provide assistance during course enrollment.

Career counseling. Career counseling is designed to help students clarify the relationship between personal skills, abilities, and career goals. Services are offered on an individual or group basis. Counselors assist in identifying career outcomes of the majors, discuss employment trends in various fields, and suggest course work appropriate to various career goals.

Post graduate advisement. Material pertaining to graduate and professional schools, graduate entrance examinations, courses of study, and career outcomes is readily available.

Students with disabilities. The college is committed to assisting students with disabilities. Students who have special needs are urged to contact the Student Disability Services (420 CCC) when they arrive on campus.

Financial aid. Students who encounter financial difficulty or anticipate running short of funds may discuss their needs with a counselor. Complete information is available from the Office of Financial Aid, 203 Day Hall.

The Human Ecology Alumni Association Cash Award Fund. This fund provides small emergency grants to students in the college who have unexpected financial problems. Applications may be made through ASCS.

Office of the Registrar

The Office of the University Registrar (B7 Day Hall) maintains the official academic records for the university and provides students with their official university transcripts. Additional information is available on the university registrar's web site: www.sws.cornell.edu/our. The college registrar (145 MVR) maintains students' official academic records, including the audit of progress toward the degree. The college registrar also provides services such as adding and dropping classes, correcting student records, issuing letters verifying that a student is registered, and approving the transfer of credit from other institutions.

Minority Programs

The College of Human Ecology at Cornell University believes that a diverse community enriches the educational process for all members of the college community. Consequently, the college focuses particular efforts on a broad range of services for students of color. This includes not only recruitment but also services for students already on campus. Additionally, the college collaborates with university and New York State programs to assure Human Ecology students have access to the vast array of services available here.

The professional staff of Human Ecology's Office of Admission, Student, and Career Services includes a director of multicultural programs who assists in the recruitment, admission, and enrollment of the most qualified and appropriate EOP (a program for New York State residents), African American, Native American, Hispanic American, and Asian American students to the college. All EOP students are invited to a special university-wide pre-freshman summer program that introduces accepted students to the Cornell campus and its classrooms. Services for current students include EOP/COSEP; academic, career, and personal counseling; recommendation letters for employment or graduate schools; and advising and support for student activities and programs.

The Human Ecology Partnership Program provides mentorship through a network of faculty and upper-class students to all incoming students of color, particularly during their first year. In addition, this office serves as a liaison to the Office of Minority Educational Affairs (COSEP), State Programs (EOP), and the Learning Strategies Center. Students are also encouraged to visit the college's Career Development Center to enhance personal career exploration and decision making.

Selected programs include the following:

BBMTA (Black Biomedical and Technical Association). A university organization that provides enrichment activities for minority students interested in pursuing medical careers. For more information, contact Janice Turner (55 Goldwin Smith, 255–5004).

ASC (Association for Students of Color). With the motto "Yesterday's vision, today's reality, and tomorrow's hope," the ASC was created to bring together Human Ecology students to provide a supportive foundation for enrollment, retention, graduation, and career placement for students of color.

The goals of the ASC are to increase communication between students of color, administration, and faculty, to assist in increasing enrollment of students of color in Human Ecology, and assist in increasing the retention of students of color in Human Ecology and in their selected majors.

ASC's four committees are recruitment and retention, student relations, career development, and peer advising. For more information contact Verdene Lee (172 MVR, 255–2532).

Human Ecology Peer Partnership Program helps incoming students of color transition to the college and university. Small groups of freshmen, usually about six to eight students, are paired with faculty and upperclassmen. They meet weekly for discussions, guidance, and explorations of the Cornell campus and the Ithaca community. For more information, contact Verdene Lee (172 MVR, 255–2532); Gary Evans in the Department of Environmental Analysis (E306 MVR, 255–4775); or Lorraine Maxwell in the Department of Design and Environmental Analysis (E310 MVR, 255–1958).

CSTEP. The Collegiate Science and Technology Entry Program is the New York State program of enrichment activities and programs for pre-med and pre-law New York State residents. Services are targeted at populations who are historically underrepresented in scientific, technical, health-related, or licensed professions and/or who are economically disadvantaged and who demonstrate interest in, and potential for, a CSTEP-targeted profession. For more information, contact Verdene Lee (172 MVR, 255–2532).

Multicultural Education

Multicultural education broadens understanding of the world's many different societies as well as the various cultures of this country. Students take courses in the Cornell programs listed below that may be used to meet degree requirements. The college encourages students to incorporate courses from these cultural programs and from study abroad experiences in their degree programs. See information on study abroad opportunities.

Africana Studies and Research Center

American Indian Program

Asian American Studies Program

East Asia Program

Gender and Global Change

Institute for European Studies

Languages and Linguistics

Latin American Studies Program

Latino Studies Program

Peace Studies Program

Program in Jewish Studies

Program for Contemporary Near Eastern Studies

Religious Studies

South Asia Program

Southeast Asia Program

Women's Studies Program

International Students

The International Students and Scholars Office (ISSO, B50 Caldwell Hall, 255–5243) provides a broad range of services to international students. All international students should maintain contact with the ISSO. Counselors in ASCS are also available for assistance.

International students in the College of Human Ecology are encouraged to meet with the college registrar to discuss any questions or concerns that they have about their academic record.

Career Planning, Graduate and Professional School, and Job Search Services

Counseling. The Office of Admission, Student, and Career Services (ASCS, 172 MVR, 255–2532) provides career counselors and resources in the Career Development Center to help students assess possible career outcomes and access educational and extracurricular programs and resources to prepare for those careers. Assistance is available through one-on-one advising or group programming. The office works with the Cornell Career Services (103 Barnes Hall, 255–5221) to facilitate access to larger, university-wide programs.

The Career Development Center (CDC, 159 MVR, 255–2532) is a starting point for students looking for career information. Selected resources about career planning and job search techniques, general directories to begin job or graduate school searches, and information for alumni networking are housed here. Also available are Cornell Career Services handouts and registration forms, graduate and professional school testing booklets and registration packets, study abroad, and Urban Semester program materials. Computer terminals provide access to web-based information regarding internship and employment opportunities, as well as graduate/professional schools.

The CDC is open most weekdays during class hours and closes at 4:00 P.M. on Fridays. Student career assistants are available during these hours to provide résumé and cover letter critiques, conduct mock interviews on video, and help navigate the library resources. Final critiques can be provided by a career counselor once the student review has been completed.

Former Urban Semester Program participants comprise a portion of the CDC student staff and are available daily to answer questions about the program and its application process.

Selected services are listed below. They will help you to investigate your interests, skills, and values as they relate to career options, provide you with useful information and tips for a successful summer or full-time job search, and provide access to employment opportunities. In addition, please refer to the college's career services web site: www.human.cornell.edu/student.

Prelaw or Premed. Students who consider themselves prelaw or premed are encouraged to join a student group affiliated with ASCS. Those interested in a law career can join PLUS (PreLaw Undergraduate Society) where information on applying to law school, preparing for the LSAT, and examining career opportunities in law is provided. Students interested in pursuing a health-related career are welcome to join PATCH (Pre-professional Association Towards Careers in Health) which serves as a link to the university health careers network and provides guidance as students prepare for the MCAT, apply to medical school, and explore the various specialties of medicine.

Extern Program. Spend one day to one week over winter break shadowing an alum in a career field of your choice. Observe day-to-day activities, discuss specific jobs and careers, and sometimes obtain limited hands-on experience. This service is available to sophomores, juniors, and seniors.

Internship and Employer Files. The CDC keeps files of more than 300 internships and hundreds of potential employers for student review.

Student Jobs and Internships. This is an electronic listing of information about internships and career-related summer and academic year employment that is exclusive to Cornellians.

Alumni Career Presentations. Alumni from the college come back to campus throughout the year to discuss their postgraduate or professional experiences. These meetings are ideal for exploring career outcomes of specific majors.

AlumNet. Students have access to Human Ecology alumni who can provide information on their careers and offer suggestions on a job search in their particular field or location. Students can query alumni on a host of variables and review selected alumni résumés to learn more about specific careers.

Job Search Workshops. The college hosts approximately 15 workshops every semester. These workshops are designed to help students market themselves for either summer or full-time job opportunities. Students learn how to conduct an effective job search, write a résumé and cover letter, and interview successfully.

Jobtrak. Exclusively for Cornell students, Jobtrak provides a listing of job opportunities available. Most are full-time jobs, although some summer opportunities are listed. Search by career field, geographic location, or both.

On-campus Recruiting. This service provides access to on-campus interviews with employers interested specifically in Human Ecology students and employers looking for Cornell graduates in general. Interviews occur primarily in banking and financial services, retail sales and management, and consulting, along with a few nonprofit organizations. All activity regarding on-campus recruiting is handled through Interactive, our web-based listing of employers.

New York Recruiting Consortium. Available exclusively to Human Ecology and Arts and Sciences students, the New York Recruiting Consortium happens in New York City over winter break. It offers interviews for full-time employment with employers involved in banking and financial services, retail sales/management, advertising, law, and consulting.

NFP in New York City and NFP in Washington, D.C. Speak with representatives from dozens of New York City or Washington, D.C. not-for-profit/public service agencies about work or internship opportunities in health, education, advocacy, government, and more (occurs only during the spring semester).

Communications Consortium. Interview with organizations in advertising, public relations, film and radio, and print media. National organizations come to Syracuse, New York to meet with you for individual appointments. During the spring semester, a job fair occurs the evening before.

GRADUATION REQUIREMENTS AND POLICIES

It is important for students to track their graduation progress by comparing their current transcript with an appropriate curriculum sheet. Unofficial transcripts and curriculum sheets are available in the Human Ecology Registrar's Office (145 MVR Hall).

Cornell Credit Requirements

- To graduate, a student must earn a minimum of 120 academic credits. An unlimited number of credits may be taken in Cornell's statutory colleges.
- Of the 120 credits required to graduate, at least 60 credits must be earned at Cornell University.

Human Ecology Credit Requirements

- The college divides the 120 minimum required academic credits into four general categories. (*Refer to curriculum sheets for your major for specific details on course selections. These sheets are available in the Office of the Registrar (145 MVR) and in the Office of Admission, Student, and Career Services (172 MVR) as well as on the college web site at www.human.cornell.edu.)*

  a) Category I—College distribution requirements

  Natural sciences

  Social sciences

  Freshman writing seminars

  Humanities

  Quantitative and analytical courses (math and statistics)

  b) Category II—Requirements for a major

  c) Category III—Electives (see definition below)

  d) Category IV—Physical education

- Students must complete a minimum of 40 Human Ecology credits in Category II.
- Within Category II, students must earn nine credits in Human Ecology departments outside the major.
- These Human Ecology courses outside the major may not include HE 100, HE 101, or any 403 course. A maximum of three credits of special studies outside the major (400, 401, and 402), or any internship credit may be applied to this requirement. A maximum of five credits of HE 470, HE 480, HE 490, or PAM 392 may be used.
- Human Ecology courses used to satisfy distribution requirements in Category I:

  1) WILL NOT count towards the 40-credit minimum in Category II.

  2) Will satisfy the nine-credit requirement for course work outside the major.

  (*Exception*: B&S majors must refer to the "NOTE" on B&S curriculum sheets at the end of Category II requirements for appropriate guidelines.)

Elective Credits

- Students have individual objectives in choosing courses beyond the minimum requirements of the major. The university is diverse; the departments, centers, and special programs numerous; the fields of study almost unlimited. Counselors and faculty advisers are available to discuss which courses may interest students and best round out their education.

Students should consult the index in this book to learn where different subjects are taught in the university. Some subjects are taught in more than one division.

Elective credits can be earned in the endowed and statutory divisions of Cornell.

Endowed Colleges

Africana Studies and Research Center

College of Architecture, Art, and Planning

College of Arts and Sciences

College of Engineering

School of Hotel Administration

Johnson Graduate School of Management

Statutory Colleges

College of Agriculture and Life Sciences

College of Human Ecology

School of Industrial Relations

College of Veterinary Medicine

- Students are allowed 21 credits of endowed courses as electives or in their major; they may take more than 21, but will then be billed at the endowed rate of tuition for the extra credits.
- To the extent possible, courses taken in the endowed colleges will be counted to meet distribution requirements in Category I. More than 40 endowed credits taken in Category I, however, will count against the 21 allowed endowed elective credits.
- Endowed credits earned in Category II (even if the endowed courses are required for the major) and Category III will be counted against the 21.
- Required credits listed in the requirements charts for Categories I and II are the minimums; credits taken in excess of those minimums count toward the additional credits required in Category III to make a total of 120 credits (exclusive of physical education). **An unlimited number of credits may be taken in the statutory colleges of Cornell.** Students may choose to take additional statutory credits and graduate with more than 120 credits.
- Elective credits in Category III earned in Cornell's endowed divisions during summer session, study abroad credits, in absentia credits, and transfer credits do not count against the 21 credits allowed in the endowed divisions.

Minimum Semester Requirements

- Students enrolling in the college as freshmen must complete at least 12 credits of Human Ecology courses by the end of the fourth semester, and at least 5 credits of Human Ecology courses must be taken in each of the freshman and sophomore years (ECON 101 and 102 may be used to fulfill this requirement).
- Students must carry 12 credits each semester, excluding physical education, to be matriculated as full-time students (*Exception*: mature students).

Requirements for Majors

- Students must fulfill the requirements specified for a major that are in effect at the time of their matriculation or thereafter.

Grade Point Average

- Students must earn a minimum cumulative grade point average of 1.7 (C-) or better to graduate.
- To be eligible for the Dean's List, students must have a semester GPA of 3.7 with no F or U grades. At least 12 credits of letter grades are required.

S-U Grade Options

- The S-U grading option may NOT be used for courses in Category I or required courses in Category II unless it is the only grade option offered for those courses. S-Us MAY be used for the nine credits of Human Ecology coursework outside of one's major and for electives in Category III.
- Students may apply no more that 12 credits of S-U towards graduation. If a required course is only offered S-U, it will not count towards this limit. Also, Honors Research 499 taken S-U does not count. Students may take more S-Us if they choose, but the additional credit cannot be applied towards graduation.

Special Studies

- Students may use only 12 credits of 400, 401, 402, or 403 courses toward graduation.
- Additional credits of 400, 401, 402, or 403 courses can be taken but will not be applied towards graduation.

"00" Courses

- "00" courses do not count towards graduation requirements but do count towards full-time semester status.

Wells, Ithaca College, and Study Abroad Credits

Any credits earned with the Wells or Ithaca College exchange program are considered Cornell credits for the purpose of fulfilling the 60 Cornell credit graduation requirement. They can not be used for Human Ecology credit. Study Abroad courses may also count as Cornell credit.

Physical Education

- Students must earn two credits of physical education within their first two semesters. These two credits do not count as part of the 60 Cornell credits, or as part of the 120 total credits required for a degree, or towards full-time status. Students who matriculate at Cornell with 12 or more credits must complete only one credit of physical education. Students who transfer more than 25 credits (excluding AP credits) are not required to take physical education at Cornell, regardless of whether they took physical education at their previous college.
- Students must pass the university's swim test. Students who transfer more than 25 credits (excluding AP credits) are exempt. Refer to page 13 of this book for specifics.

Advanced Placement Credit

Students can earn advanced placement credit from one of the following:

1. The requisite score on a departmental examination at Cornell (usually given during orientation week) or on a College Entrance Examination Board (CEEB) achievement test. The requisite scores for the CEEB exams are determined by the relevant department at Cornell, vary by subject, and are listed in the beginning of this book (pages 6 and 7).
2. A regular course taught at an accredited college to college students and approved by the relevant department at Cornell. Some departments have delegated the review of courses to college staff according to guidelines they have formulated. Some departments review each request individually. Some departments accept credit from virtually all accredited colleges; some do not.
3. Credit from the international baccalaureates is evaluated individually.

Note: Cornell does not accept credit for courses sponsored by colleges but taught in high schools to high school students. This is true even if the college provides a transcript of such work. Students who have taken such courses may, however, take the appropriate CEEB test to qualify for credit as in paragraph 1 above. For information and limitations on Advanced Placement credit, see pages 6 and 7 of this book.

Foreign Language Study and Placement

Students who studied a foreign language before coming to Cornell and who want to continue must take either the CEEB test in that language or a departmental language placement test. The latter is given during orientation week in September and again in December, January, and May. Human Ecology students who plan to work with non-English–speaking people in this country or abroad often find it necessary to be proficient in another language. Many study abroad programs in non-English-speaking countries require the equivalent of two years of college-level language study. For more detailed information, see Advanced Placement Credits.

Extramural Credit

Extramural credit is administered by the Office of Continuing Education and Summer Sessions (B20 Day Hall, 255–4987). Extramural credit is charged by the credit hour at the endowed tuition rate. Students may count only 15 credits of extramural credit toward their degree requirements. A student may enroll for extramural credit during the fall or spring semester only if he or she is not registered in the College of Human Ecology. For example, some students enroll for extramural credit before matriculating at Cornell.

An exception to this rule is credit earned in the Ithaca College or Wells College exchange. Students enrolled in these programs simultaneously maintain their status as students registered in the College of Human Ecology.

Humanities

Only certain classes will count for Category I.D, Humanities. To determine eligibility the college uses the following definition: "The humanities include the study of literature, history (including art and design history), philosophy, religion, and archaeology. Critical, historical, and theoretical studies of the arts and design are considered humanities. Languages and creative or performing arts such as the writing of fiction or poetry, painting, sculpting, designing, composing or performing music, acting, directing, and dance are not considered humanities." Additionally, social science courses such as sociology, government, anthropology, and psychology are not considered humanities.

Specifically, courses in the following list will count as humanities:

Africana Studies (literature and history)

Archaeology

Asian American Studies

Asian and Near Eastern Studies (literature and history)

Classics (literature and history)

Comparative Literature

English (literature only)

History

History of Art/History of Architecture

LA 282

Music and Theatre Arts (theory, literature, and history only)

Natural Resources 407, 411

Philosophy

Religious Studies

Rural Sociology 100, 175, 318, 442

S&TS 205, 206, 233, 250, 281, 282, 286, 292, 358,360, 381, 384, 389, 433, 444, 447, 472, 481, 490

HD 241, 359, 417

DEA 111, 243, 251, 443

PAM 631, 634, 652

PROCEDURES

Registration and Course Enrollment

Registration Requirements

University registration is the official recognition of a student's relationship with the university and is the basic authorization for a student's access to services and education. Completion of registration is essential to enable the university to plan for and provide services and education, guided by the highest standards for efficiency and safety. Unauthorized, unregistered persons who use university services and attend classes have the potential to use university resources inappropriately and to displace properly registered students. In addition, the university assumes certain legal responsibilities for persons who participate as students in the university environment. For example, policy states that New York State health requirements must be satisfied. Because these requirements are intended to safeguard the public health of students, the university has a responsibility to enforce the state regulations through registration procedures.

The policy on university registration is intended to describe clearly the meaning of and the procedures for registration so that students can complete the process efficiently and be assured of official recognition as registered students. With the clear communication of the steps for registration, it is hoped that compliance will occur with a minimum of difficulty.

To become a registered student at Cornell University, a person must complete course enrollment according to individual college requirements; settle all financial accounts including current semester tuition; satisfy New York State health requirements; and have no holds from the college, the office of the Judicial Administrator, Gannett Health Center, or the Bursar.

Individuals must become registered students by the end of the third week of the semester. Cornell University does not allow persons who are not registered with the university in a timely manner to attend classes. The university reserves the right to require unauthorized, unregistered persons who attend classes or in other ways seek to exercise student privileges to leave the university premises.

Verification of Registration

Many insurance companies or scholarship funds require verification of full-time registration at Cornell. Should students need such verification, request an official letter from the Office of the University Registrar (B-7 Day Hall). Students who need letters of good standing should contact the Human Ecology Registrar's Office (145 MVR).

Bursar Bill

A bursar bill is sent to each student over the summer and winter breaks; it summarizes what is owed to the university. The bursar bill can also be viewed through Just the Facts. Any questions regarding the bursar bill can be directed to the Bursar's Office (260 Day Hall, 255–2336). Initial New York State residency eligibility is determined during the admissions process, but the Bursar's Office will handle any request for a status change after matriculation.

Late University Registration

A student clearing his or her financial obligations after the deadline date on the bursar's bill is considered late. **Late registrants are assessed a finance charge on the bursar's bill starting from the date the bill is due**. According to university policy, all

students must be registered before the end of the third week of classes. If for any reason a student registers after that time, the Bursar's Office will charge a late fee. **Students who fail to register by the third week of the term may be withdrawn from the university. Should withdrawn students wish to return, they must reapply through the admissions committee.**

Proration of Tuition

Except for mature students, it is seldom possible to have tuition prorated if a student carries fewer than 12 credits during a semester. (See the college registrar or counselors for more information.) Students of mature status may carry 6 to 11 credits without petitioning; but must request that their tuition be prorated. All requests should be made to the college registrar by the first week of classes and no later than the third week of the term.

Course Enrollment

Initiating the process

Students are expected to make course requests for the subsequent semester during a specified time in the current semester. Those dates are advertised publicly and available on the University Registrar's web site (www.sws.cornell.edu/our). CoursEnroll takes place electronically, using software available through Just the Facts. During this time, each student must meet with his or her faculty adviser to discuss academic plans and to obtain the advising PIN code required for finalizing course requests. A student may enter and hold courses prior to entering their PIN. Once the PIN number is entered, however, the schedule is locked and it is not possible to change until the add/drop period of the next term. Information on courses is readily available in this book and in the *Course and Time Rooster* for each semester. Both of these publications can be accessed on the web through CUInfo.

Incoming students will receive tentative schedules upon their arrival to campus, and will meet with faculty advisers during the orientation period.

Course Loads

The normal course load in the college ranges from 12 to 18 credits, although there is no limit to the number of statutory credits a student may take each semester. Nonetheless, students should avoid planning excessive workloads; the time required to keep abreast of courses tends to increase as the semester progresses. Classes cannot be withdrawn from after the seventh week of classes without petitioning and by substantiating extenuating circumstances. Students should avoid the need to drop courses by taking on a reasonable workload and using the drop period to make changes in their program.

Except for those with mature student status, students must carry at least 12 credits (exclusive of physical education) to maintain full-time status. In special cases, a student may petition to carry between 8 and 12 credits. Forms for petitioning and advice on how to proceed are available from the Office of Admission, Student, and Career Services (172 MVR).

Late Course Enrollment

Students who do not complete course enrollment during the CoursEnroll period usually must wait until the beginning of the next semester's add/drop period to enroll. Extensions are rarely granted and usually only for documented illness.

Students who do not meet the deadline for any reason should see the college registrar in 145 MVR as soon as possible. The college registrar can explain available options and course enrollment procedures under such circumstances.

Note: Students can review their course schedule via computer using Just the Facts. Students are responsible for checking their course schedule for accuracy of course numbers, credit hours, grade options, and other data. Errors must be corrected immediately. Procedures for correcting enrollment errors as well as for making any other changes are described below under Course Enrollment Changes.

Course Enrollment Changes

It is to the student's advantage to make any necessary course enrollment changes as early in the term as possible. Adding new classes early makes it easier for the student to keep up with class work. Dropping a class early makes room in the class for other students who may need it for their academic programs.

Ideally, students evaluate their class workload carefully at the beginning of the term. If, in the first week or two, the instructors do not discuss the amount of material to be covered and the extent of student assignments, students need to ask about course requirements.

Some procedures required for course enrollment are also required for course enrollment changes. For example, students must obtain the instructor's permission for a course requiring it, and must complete the same forms for special studies courses. Aside from the procedures listed below for course enrollment changes, all drop/add forms for nutritional science majors must be signed by a faculty adviser.

Deadlines for Add/Drop and Grade Option Changes

- During the first three weeks of the term, courses may be added, dropped, or the grade option changed.
- From the fourth through the seventh week of the term, courses may be dropped. **Grade option changes cannot be made at this point regardless of instructor's permission.**
- From the fourth week of the term, instructors have the right to consider students' requests for course changes on an individual basis or to announce at the beginning of the term a specific date between the fourth and seventh weeks beyond which they will no longer approve course changes.
- **After the seventh week of the term, any requests for course changes must be made through the petition process.**
- After the seventh week of the term, any student granted permission to drop a course after petitioning will automatically receive a grade of W (Withdrawn), and the course will remain on the official transcript, even if repeated in a later term.

Deadlines for Half-Term Courses

Students may drop half-term courses within the first three-and-one-half weeks of the course. Students may add a course after the first week of classes only with the permission of the instructor. After the first three-and-one-half weeks, students must petition to drop the course.

Procedures for Add/Drop and Grade Option Changes

To make course changes during the add/drop period, a student must take the following five steps:

1. Obtain an add/drop form from the Human Ecology Registrar's Office (145 MVR).
2. Complete the form and take it to the appropriate office for a signature: for Human Ecology courses, the forms should be taken to the Human Ecology Registrar's Office; for courses outside the college, the forms should be taken to the appropriate departmental office of the college. **(Students in the Division of Nutritional Sciences must have their adviser's signature on all add/drop forms.)**
3. Make sure their name is added to the list of enrolled students for a course being added, or removed from the class list for a course being dropped. Ask the person recording the change to sign the form.
4. Submit all signed forms to the Human Ecology Registrar's Office, including the forms for out-of-college courses. Changes are not completed until the signed forms are filed in that office. Students who do not drop a course they no longer attend are in danger of receiving an F in the course.
5. Receive carbon copies of each course change form at the time it is submitted. **It is important for students to keep these copies to verify any changes.**

To make course changes after the seventh week of the term, a student must file a general petition form. (See the section, *Petition Process*.) Students are expected to attend classes and to do assigned work until the petition has been formally approved or denied.

Time and Place for Add/Drop and Grade Option Changes

All students may adjust their schedules and grading options during the first three weeks of each semester. The university also holds a course exchange the day before fall classes begin where students have the opportunity to change their class enrollment in centralized locations. The Human Ecology Course Exchange is located in the MVR auditorium. For course exchange location for other colleges check the registration website each semester.

Permission of Instructor

Certain courses may be taken only with the permission of the instructor as indicated in this book. Undergraduates must obtain permission of the instructor to take any graduate course. Students must request the

instructor's permission during the CoursEnroll period by placing their name on a list maintained by the departmental advising assistant.

Students interested in taking a course in the Department of Art in the College of Architecture, Art, and Planning are required to register with the departmental secretary (100 Olive Tjadan Hall) before enrolling in the course. Seniors who want to take an elective course in the Johnson Graduate School of Management are required to obtain permission of the instructor on a course authorization form that the student then files with that school's registrar in Sage Hall.

Course Enrollment while Studying Abroad

Students who plan to study abroad have several options available to enroll for their returning semester at Cornell. Students can consult with their faculty adviser before departure to consider the schedule of classes that they will take upon their return to campus. Once abroad, the student can use the web to access the Cornell University *Courses of Study* and the *Course and Time Roster* for the coming term. The roster is available on the web in approximately the first week of October and the first week of March. Using these resources, the student can e-mail the course requests to the student's faculty adviser for approval; the faculty adviser can then e-mail them to the college registrar. A student who does not have access to the Internet while abroad can wait for the *Course and Time Roster* to arrive via airmail from the Cornell Abroad Office. The student can then e-mail, fax, or mail the course requests to their faculty adviser and ask the faculty adviser to submit the course requests to the college registrar. *The Course and Time Roster* becomes available only the day that pre-enrollment begins; thus, students who depend on receiving the mailed copy will experience some delay in submitting their course requests.

Oversubscribed Courses

Enrollment in many human ecology courses is limited. When a course is over enrolled, students are generally assigned on the basis of seniority or by criteria defined for each course as listed in this book. Students' professional goals may be considered. Those students not admitted to a course may be placed on a waiting list.

Course Wait List

The Human Ecology Registrar's Office maintains waiting lists for selected courses to accommodate students who want to enroll in courses that have been filled. Course instructors are responsible for determining the criteria to fill their classes from waiting lists. Waiting lists are maintained only for the first three weeks of each semester.

Limited Enrollment Classes

Students who do not attend the first two class sessions of courses with limited enrollment may be dropped from the course list. Students can avoid being dropped from a class by notifying the instructor that unavoidable circumstances have prevented their attendance.

Special Studies Courses

Each department in the College of Human Ecology (DEA, HD, DNS, PAM, and TXA) offers special studies courses that provide opportunities for students to do independent work not available in regular courses. One of those courses, designated 300, Special Studies for Undergraduates, is intended primarily for students who have transferred from another institution and need to make up certain course work.

The other special studies courses are 400, Directed Readings; 401, Empirical Research; and 402, Supervised Fieldwork. Junoirs and seniors normally take those courses, and a faculty member in the department in which the course is offered supervises work on an individual basis. It is important for students to use the appropriate course number (300, 400, 401, or 402) for a special project.

To register for a special studies course, a student obtains a special studies form from the departmental office where they plan to take the course. The student discusses the proposed course with the faculty member under whose supervision the study would be done and then prepares a plan of work. If the faculty member agrees to supervise the study, the student completes a special studies form and obtains signatures from the instructor, department chair, and faculty adviser before submitting the form to the Office of the College Registrar (145 MVR). The student must also submit a course registration form (add/drop form) to the Office of the College Registrar. Special studies forms are available in 145 MVR or in departmental offices. Add/drop forms are only available in 145 MVR.

Semester credits for special studies courses are determined by the number of contact hours the student has with the supervising faculty member (or a person designated by the faculty member). To earn one credit, a student must have the equivalent of three hours of contact time per week for 15 weeks (a total of 45 contact hours). For additional credit, multiply the number of credits to be earned by 45 to determine the number of contact hours needed for the course. **A student can only use 12 credits of 400, 401, 402, or 403 courses towards graduation and only three 400-, 401-, or 402-credits can be used to satisfy the nine-credit-outside-the-major requirement**. To register in a special studies course taught in a department outside the college, follow the procedures established by that department.

Changes in status

General Petition Process

The petition process permits students to request exceptions to existing regulations. Petitions are considered individually, weighing the unique situation of the petitioning student with the intent of college and university regulations. In most cases, extenuating circumstances are needed for a petition to be approved if it involves waiving a deadline. These are situations beyond a student's control, such as a documented medical emergency.

Students can avoid the necessity to petition by carefully observing the deadlines that affect their academic program. See the Course Enrollment Changes section above for some of the important deadlines. If unsure of a deadline, check with a counselor in the Office of Admission, Student, and Career Services (172 MVR) or with the Office of Registrar's staff (145 MVR).

A general petition may be needed to carry fewer than 12 credits, withdraw from a class after the seventh week deadline, add a course after the third week deadline, change a grade option after the third week deadline, be exempt from one or more of the college's graduation requirements, substitute a required course in one's major with another course, or stay an additional semester to complete the graduation requirements.

Although many kinds of requests can be petitioned in the college, options other than petitioning may be preferable in some cases. To explore whether a petition is appropriate, the student may discuss the situation with a college counselor or the college registrar.

If a student decides to submit a general petition, the form is available in the Office of the Registrar (145 MVR) and in the Office of Admission, Student, and Career Services (172 MVR) or on the web at www.human.cornell.edu/student/forms/. After completing the form and obtaining the required signatures, the student must turn the form in to the Office of the Registrar. Once a decision is made, a letter is placed in the student's mail folder indicating approval or denial of the petition.

Students may appeal the college registrar's decision to the Committee on Academic Status. Students who elect to appeal have the option of appearing in person before the committee to state their case. A member of the counseling staff can guide a student through this process.

In Absentia Study

Under certain conditions, credit toward a Cornell degree may be given for in absentia study, that is, study done at an accredited institution away from Cornell after the student matriculates in the College of Human Ecology. In absentia study can be done during any term; fall, winter, spring, or summer.

To be eligible for in absentia study, a student must be in good academic standing and must receive permission in advance from the college registrar. Students not in good standing may study in absentia but will not receive transcript credit until the Committee on Academic Status has returned them to good standing. In some cases, students may petition for in absentia credit after the work has been completed, but there is no guarantee that such credit will be awarded without advance approval.

In absentia petition forms are available in the Human Ecology Registrar's Office (145 MVR) or on the web at www.human.cornell.edu/student/forms/. The student completes the form, attaches catalog descriptions for the courses that will be taken, then submits the form to the Human Ecology Registrar's Office (145 MVR). In absentia study during the fall or spring term carries a nominal administrative fee. (Contact the Bursar's Office, 260 Day Hall, for the current amount).

Students will receive a letter in their mail folder from the college registrar notifying them of the petition decision.

A student may take up to 15 credits in absentia as long as the courses do not duplicate courses already taken and the in

absentia courses are applicable to the requirements of the college. Students who study abroad during the summer or winter term are limited to a maximum of nine in absentia credits. Study abroad during the fall or spring semester must be done through the Study Abroad Office and is not considered in absentia study.

On rare occasions a student's petition for more than 15 credits in absentia may be allowed: (1) the work taken represents a special educational opportunity not available at Cornell, (2) it relates to the student's particular professional goals, and (3) those goals are consistent with the focus of the college. The in absentia petition form is used to request more than 15 credits in absentia. Wells and Ithaca College credit are not considered in absentia credit and are not included in the 15 credit limit.

The college registrar requests approval from the appropriate department if a student wants to apply in absentia credit to requirements in his or her major. If in absentia credit is sought for a modern foreign language in which the student has done work, approval by the Department of Modern Languages and Linguistics (College of Arts and Sciences) must be obtained. The department will recommend the number of credits the student should receive and may require the student to take a placement test after returning to Cornell.

The student is responsible for having the registrar of the institution where in absentia study is taken send transcripts of grades to the Human Ecology Registrar's Office at 145 MVR Hall. Only then will credit be officially assessed and applied to the Cornell degree. Credit for in absentia study will be granted **only** for those courses with grades of C- or better. Only credits (not course names and grades) for in absentia study appear on the Cornell University transcript.

A student who holds a Regents' or Children of Deceased or Disabled Veterans Scholarship may claim that scholarship for study in absentia if the study is done in a college in New York State and if it is for a maximum of 15 credits acceptable to the College of Human Ecology.

The rules regarding study in absentia apply to transfer students with the additional stipulation that at least 60 credits must be taken at Cornell. At least 40 of the 60 credits must be in the College of Human Ecology at Cornell unless the student has transferred equivalent human ecology credit. (No more than 20 credits of equivalent credit may be applied to the 40 credits required in human ecology course work.)

Leaves of Absence

A student may request a leave of absence before the beginning of the semester or during the first seven weeks of the semester for which a leave is sought. A leave may be extended for a second semester by making a written request to the Office of Admission, Student, and Career Services. Note that in absentia study status and leave of absence status are mutually exclusive. Students on leave must notify the college registrar in MVR 145, in writing, of their intention to return to campus prior to the beginning of the semester. Those whose leave period has expired will be withdrawn from the college after the seventh week of the semester they were due back.

Students considering a leave of absence should discuss their plans with a counselor in the Office of Admission, Student, and Career Services. The counselor can supply the necessary forms for the student to complete and file with the Human Ecology Registrar's Office (145 MVR). Leaves initiated after instruction begins will be charged a percentage of the semester tuition. (Refer to Bursar Information in this book for a billing schedule.)

Requests for a leave of absence received after the first seven weeks of the semester, or requests for a leave of absence from students who have already had two semesters' leave of absence, will be referred for action to the Committee on Academic Status. The committee may grant or deny such requests, attaching conditions as it deems necessary. Leaves of absence after the first seven weeks are generally granted only when there are compelling reasons why a student is unable to complete the semester, such as extended illness.

A student who requests a leave of absence after the first seven weeks is advised to attend classes until action is taken on the petition. A student whose petition for a leave of absence is denied may choose to withdraw or to complete the semester. If the petition for leave is approved the student's courses will remain on the transcript with "W"s.

The academic records of all students who are granted a leave of absence are subject to review, and the Committee on Academic Status may request grades and other information from faculty members to determine whether the student should return under warning or severe warning or in good academic standing.

Under certain documented medical circumstances a student may be granted a **medical leave of absence**. Medical leaves are initiated by the student with Gannett Health Center. If Gannett Health Center recommends a medical leave for the student, the college registrar may grant the leave. A medical leave is for an indeterminate period of time not to exceed five years. Students who are granted a medical leave of absence are encouraged to maintain contact with a counselor in the Office of Admissions, Student, and Career Services (255–2532) to arrange their return to campus. The counselor will advise the student on procedures to obtain a recommendation from Gannett Health Center to the college registrar for the student's return. The student should plan sufficiently in advance to assure time for Gannett Health Center and the college registrar to consider their request.

Withdrawal

A withdrawal is a termination of student status at the university. Students may voluntarily withdraw at any time by notifying a counselor in the Office of Admission, Student, and Career Services and filing a written notice of withdrawal in the Human Ecology Registrar's Office. A student considering such an action is urged to discuss plans with a counselor in the Office of Admission, Student, and Career Services (172 MVR).

In some instances a student may be given a withdrawal by the college registrar. Students who leave the college without an approved leave of absence, or do not return after the leave has expired will be given a withdrawal after the seventh week of the term in which they fail to register.

A student who has withdrawn from the college or who has been given a withdrawal by the college registrar and who wishes to return at a later date must reapply through the Office of Admissions for consideration along with all other applicants for admission. If the student was in academic difficulty at the time of the withdrawal, the request for readmission will be referred to the Committee on Academic Status for consideration, and that committee may stipulate criteria under which the student may be readmitted to the college.

GRADES AND EXAMINATIONS

Grade Definitions and Equivalents

The official university grading system uses a system of letter grades ranging from A+ to D- with F denoting failure. An INC grade is given for incomplete work and R is given at the end of the first semester of a two-semester class. If a student is given permission to withdraw from a class after the seventh week of the term a W is automatically assigned. Students can view their grades on Just the Facts after the semester has ended. Final spring semester grades are mailed to student's homes during the summer. See the "Grading Guidelines" section in this book for more information on the official university grading policies.

To compute a semester grade point average, first add up the products (credits hours X grade quality points) and divide by the total credit hours taken. Grades of INC, R, S, SX, U, UX, and W should not be included in any GPA calculations. A grade of F has no quality points, but the credits are counted thereby lowering the average. A cumulative GPA is just the sum of all semester products divided by all credits taken. For further help on calculating a grade point average ask at the Office of the College Registrar (145 MVR).

These are the quality point equivalents:

A+ = 4.3	C+ = 2.3
A = 4.0	C = 2.0
A- = 3.7	C- = 1.7
B+ = 3.3	D+ = 1.3
B = 3.0	D = 1.0
B- = 2.7	D- = 0.7
	F = 0.0

S-U Grades

Some courses in the college and in other academic units at Cornell are offered on an S-U basis; that fact is indicated in this book. Courses listed as SX-UX are only available on an S-U basis and may not be taken for a letter grade. University regulations concerning the S-U system require that a grade of S be given for work equivalent to a C- or better; for work below that level, a U must be given. **No grade point assignment is given to S, and S or U grades are not included in the computation of semester or cumulative averages**. A course in which a student receives an S is, however, counted for credit. No credit is received for a U. Both the S and U grades appear on a student's record. A student who is attempting to qualify for the Dean's List must take at least 12 credits of A-F grades. See the section, *Awards and Honors* for more details about the Dean's List.

No more than 12 S-U credits will count towards a student's 120-credit graduation requirement. However, a student may take more than one S-U course in any one semester**. S-U courses may be taken only as electives or in the nine credits required in the college outside the major** unless the requirements for a specific major indicate otherwise. Freshmen enrolled in English 137 and 138 (offered for S-U grades only) are permitted to apply those courses to the freshman writing seminar requirement. If a **required** course is only offered S-U, it will not count toward the 12-credit or four-course limit. To take a course for an S-U grade, a student must check the course description to make sure that the course is offered on the S-U basis; then either sign up for S-U credit during course enrollment, or file an add/drop form in the Human Ecology Registrar's Office before the end of the third week of the term. Forms are available in the Human Ecology Registrar's Office. After the third week of the term, students cannot change grade options.

Note: students considering medical school or law school should discuss selecting any S-U option with the college's pre-med/pre-law adviser, Paula Jacobs (172 MVR).

Grades of Incomplete

A grade of incomplete is given when a student does not complete the work for a course on time but when, in the instructor's judgment, there was a valid reason. A student with such a reason should discuss the matter with the instructor and request a grade of incomplete.

A grade of incomplete may remain on a student's official transcript for a maximum of two semesters and one summer after the grade is given, or until the awarding of a degree, whichever is the shorter period of time. The instructor has the option of setting a shorter time limit for completing the course work.

If the work is completed within the designated time period, the grade of incomplete will be changed to a regular grade on the student's official transcript. **If the work is not completed within the designated time period, the grade of incomplete automatically will be converted to an F**.

When a student wants to receive a grade of incomplete, the student should arrange a conference with the instructor (preferably before classes end and the study period begins) to work out the agreement. A form, called explanation for reporting a final grade of F or incomplete, which must be signed by both the instructor and the student, needs to be submitted by the instructor to the Human Ecology Registrar's Office. This form is submitted with the final grade sheets whenever a grade of incomplete is given. This form is for the student's protection, particularly in the event that a faculty member with whom a course is being completed leaves campus without leaving a record of the work completed in the course. If circumstances prevent a student from being present to consult the instructor, the instructor may, if requested by the student, initiate the process by filling out and signing part of the form and turning it in to the Human Ecology Registrar's Office with the grade sheet. Before a student will be allowed to register for succeeding semesters, he or she must go to the Human Ecology Registrar's Office to fill out and sign the remainder of the form.

If the work is satisfactorily completed within the required time, the course appears on the student's official transcript with an asterisk and the final grade received for the semester in which the student was registered for the course. A student who completes the work in the required time and expects to receive a grade must take the responsibility for checking with the Human Ecology Registrar's Office (about two weeks after the work has been handed in) to make sure that the grade has been received. Any questions should be discussed with the course instructor.

Grade Disputes

Students who find themselves in disagreement with instructor over grades have several options:

1. Meet with the instructor and try to resolve the dispute.
2. Meet with the chair of the department in which the instructor has their appointment.
3. Meet the associate dean for undergraduate studies of the college in which the course was taught.
4. Meet with the university ombudsman (118 Stimson Hall, 255–4321).

A student may also seek advice from their faculty adviser or with a counselor in the Office of Admission, Student, and Career Services (172 MVR).

Repeating Courses

Students are allowed to register a second time for a course they have already passed or have received an "F." If a student has previously passed a course they are taking a second time, the second registration will not count towards their degree requirements and the grade received will not be included in their cumulative GPA.

If a student enrolls in a course in which they previously received an F, the credits from the second registration will count towards their graduation requirements and the grade will be included in their cumulative GPA. The F will also remain on the record and will be included in the GPA.

Examinations

Both the preliminary and final examination schedules are printed every semester in the *Course and Time Roster*. The current exam information is also available on the university web page at www.cornell.edu/Academic/Academic.html#Class.

Final Examinations

The following is quoted from the Cornell University Faculty Handbook, 1990, pages 66–67:

"The University Faculty long ago established, and has never reversed, the policy that each course should require a final examination or some equivalent exercise (for example, a term paper, project report, final critique, oral presentation, or conference) to be conducted or due during the period set aside for final examinations.

"Although not specifically prohibited, it is University policy to discourage more than two examinations for a student in one twenty-four hour time period and especially on any one day. It is urged that members of the faculty consider student requests for a make-up examination, particularly if their course is the largest of the three involved and thus has the strongest likelihood of offering a makeup for other valid reasons, i.e. illness, death in the family, etc.

Legislation of the University Faculty governing study period and examinations is as follows:

1. No final examinations can be given at a time other than the time appearing on the official examination schedule promulgated by the Registrar's Office without prior written permission of the Dean of the Faculty.
2. No permission will be given, for any reason, to schedule final examinations during the last week of classes or the designated study period preceding final examinations.
3. Permission will be given by the Dean of the Faculty to reschedule examinations during the examination period itself if requested in writing by the faculty member, but only on condition that a comparable examination also be given for those students who wish to take it at the time that the examination was originally scheduled. The faculty member requesting such a change will be responsible for making appropriate arrangements for rooms or other facilities in which to give the examination. This should be done through the Registrar's Office.
4. No tests are allowed during the last week of scheduled classes unless such tests are part of the regular week-by-week course program and are followed by an examination (or the equivalent) in the final examination period.
5. Papers may be required of students during the study period if announced sufficiently far in advance that the student did not have to spend a significant segment of the study period completing them.
6. Faculty can require students to submit papers during the week preceding the study period.
7. Take home examinations should be given to classes well before the end of the regular term and should not be required to be submitted during study period but rather well into the examination period.

Students have a right to examine their corrected exams, papers, and the like, in order to be able to question their grading. They do not, however, have an absolute right to the return thereof. Exams, papers, etc., as well as grading records, should be retained for a reasonable time after the end of the semester preferably until the end of the following term, to afford students such right of review."

Preliminary Examinations

The following is quoted from the Cornell University Faculty Handbook (1990), pages 65–66:

"Preliminary examinations are those given at intermediate times during a course. It is common to have three of these in a term to encourage review and integration of major

segments of the course, to provide students with feedback on how well or poorly they are progressing, and to contribute to the overall basis for a subsequent final grade.

The most convenient times and places for "prelims" are the normal class times and classrooms. But many courses, particularly large ones with multiple sections, choose to examine all the sections together at one time and to design an examination that takes more than one class period to complete. In such cases the only alternative is to hold the prelim in the evening. This practice creates conflicts with other student activities, with evening classes and laboratories, and among the various courses that might choose the same nights.

To eliminate direct conflicts, departments offering large multisection courses with evening prelims send representatives annually to meet with the dean of the University Faculty to lay out the evening prelim schedule a year in advance. Instructors of smaller courses work out their own evening prelim schedules, consulting their students to find a time when all can attend. Room assignments are obtained by the faculty member through the contact person in his or her college or the Central Reservations Coordinator.

The policy governing evening examinations is as follows:

1. Evening examinations may be scheduled only on Tuesday and Thursday evenings and only after 7:30 P.M. without prior permission from the Office of the University Faculty.
   a. Such prior permission is not, however, required for examinations or makeup examinations involving small numbers of students (generally 30 or fewer) provided that the scheduled time is acceptable to the students involved and that an alternate examination time is provided for those students who have academic, athletic, or employment conflicts at the time scheduled.
2. Permission from the Office of the University Faculty to schedule on evenings other than Tuesdays and Thursdays or at a time prior to 7:30 P.M. will be granted only on the following conditions:
   a. Conditions such as the nature of the examination, room availability, large number of conflicts, etc., justify such scheduling.
   b. An alternate time to take the exam must be provided for those students who have academic, athletic, or employment conflicts at the time scheduled.
3. If there is a conflict between an examination listed on the schedule developed at the annual evening prelim scheduling meeting and an examination not on the schedule, the examination on the schedule shall have a priority, and the course not on the schedule must provide an alternate time to take the examination for those students faced with the conflict.
4. If there is a conflict between examinations, both of which are on the schedule developed at the annual evening prelim scheduling meeting or both of which are not on the schedule, the instructors of the courses involved must consult and agree on how to resolve the conflict. Both instructors must approach this resolution process with a willingness to provide an alternative or earlier examination.
5. Note that courses using evening examinations are strongly urged to indicate this in the course description listed in Courses and must notify students of the dates of such examinations as early as possible in the semester, preferably when the course outline is distributed."

ACADEMIC STANDING

Criteria for Good Standing

The College of Human Ecology has established a set of minimum academic standards which all students must meet or exceed each semester. These standards are as follows:

1. A student must maintain a semester and cumulative grade point average of 1.7 or higher.
2. A student must successfully complete at least 12 credits per semester, excluding physical education courses.
3. Freshmen and sophomore students must complete at least one human ecology course each semester. (ECON 101 and ECON 102 are considered Human Ecology courses).
4. A student must be making "satisfactory progress" toward a bachelor's degree.

Upon the completion of each semester the Committee on Academic Status (CAS) reviews each student's academic record to ensure the above academic standards are upheld. The committee then takes appropriate action for students whose academic achievement is considered unsatisfactory as defined by the above criteria. The five voting faculty members, along with several nonvoting student services staff, consider each case individually before deciding on a course of action. The committee may take any of the following actions depending on the seriousness of the student's academic difficulties:

1. Take no action.
2. Return the student to **Good Standing**.
3. Place the student on a **Review List**, which means the case will be monitored throughout the semester.
4. Place the student on a **Warning** status.
5. Place the student on a **Severe Warning** status.
6. Place the student on a **Severe Warning with Danger of Being Dropped** status, implying that if the student does not show considerable improvement during the semester the committee will likely drop the student at the end.
7. **Suspend** the student for one or more terms during which the student may not register at Cornell (except in extramural status with CAS approval).
8. Permanently **withdraw** the student from the college and Cornell University.

Students who have been suspended or withdrawn have the right to appeal the decision in front of the committee during the appeals meeting. Students who have been placed on warning due to incomplete or missing grades may request their status be updated to good standing once they have cleaned up their records. These requests should be made with a general petition and submitted to the Office of the Registrar.

All students with a status will automatically be reviewed at the end of the subsequent semester. In most cases, students put on a warning, severe warning, or severe warning with danger of being dropped status will be informed of conditions that they are expected to fulfill in order to return to good standing. In general these conditions are that a student must earn a minimum GPA of 2.0, complete 12 credits, and not have any incomplete, missing, "F", or "U" grades on their semester record.

If a student who has been previously suspended wishes to return to the college he/she must submit a plan of study to the committee before being rejoined.

Students who have been withdrawn by CAS may request reconsideration and ask to be readmitted by the committee. Such students have three years from the date they were withdrawn to make this request. After three years, a former student must apply for admission through the Office of Admission. A student should discuss their situation with a counselor in the Office of Admission, Student, and Career Services (172 MVR). They should also talk with others who may be able to help them—faculty advisers, instructors, or a member of the medical staff. A students may also write directly to the committee (via the committee chair, whose name can be obtained from the college registrar) and present new or previously unknown information. Any information given to the committee is held in the strictest confidence.

Academic Integrity

Academic integrity is a critical issue for all students and professors in the academic community. The University Code of Academic Integrity states that (1) a student assumes responsibility for the content and integrity of the academic work he or she submits, such as papers, examinations, or reports and (2) a student shall be guilty of violating the code and subject to proceedings under it if he or she:

a. Knowingly represents the work of others as his or her own.
b. Uses or obtains unauthorized assistance in any academic work.
c. Gives fraudulent assistance to another student.
d. Fabricates data in support of laboratory or fieldwork.
e. Forges a signature to certify completion of approval of a course assignment.
f. Uses an assignment for more than one course without the permission of the instructor involved.
g. Uses computer hardware and/or software to abuse privacy, ownership, or user rights of others.
h. In any manner violates the principle of absolute integrity.

The Academic Integrity Hearing Board, which consists of a chairperson, three faculty

members, and three students, hears appeals from students who have breached the code. It also deals with cases brought directly to it by members of the faculty.

Academic Records

Students may obtain their Cornell academic record in several ways. The **Cornell transcript**, which is the official record of the courses, credits, and grades that a student has earned can be ordered with no charge at the Office of the University Registrar (B7 Day Hall). For more information call (607) 255–4232. Students who merely want an unofficial working copy of their transcript can request a copy of their **record card** from the Office of the College Registrar (145 MVR). Students may also access their grades and course schedules electronically using **Just the Facts**. **Student should be in the habit of checking Just the Facts by the second week of every semester to confirm that their schedule and grade options are correct**.

The college also maintains a **graduation progress worksheet** for each student showing progress towards the degree. At the beginning of fall term continuing students receive a copy of their worksheet. It is important to check this document and bring any errors to the attention of the staff in the Office of the College Registrar (145 MVR).

Access to Records

The Family Educational Rights and Privacy Act of 1974 assures students of privacy of their records. The law also assures students' access to their records. Information concerning a student's relationship with the university is considered restricted and may be released only at the student's specific written request. Restricted information includes the courses elected; grades earned; class rank; academic and disciplinary actions by appropriate faculty, student, or administrative committees; and financial arrangements between the student and the university. Letters of recommendation are restricted information unless the student has specifically waived right of access.

Students who want additional information on access to their records may contact the Office of the College Registrar (145 MVR) or the Office of the University Registrar (B7 Day Hall). An inventory of those student records maintained by Cornell University offices in Ithaca, their location, and cognizant officer are available in the Office of the Dean of Students (401 Willard Straight Hall).

For specific information, refer to the university's policy, "Access to Student Information," at the following web address: www.univco.cornell.edu/policy/ASI.html, or talk with the college registrar in the Office of the College Registrar (145 MVR).

ACADEMIC HONORS AND AWARDS

The college encourages high academic achievement and recognizes outstanding students in several ways.

Honors

Dean's List. Excellence in academic achievement is recognized each semester by placing on the Dean's List the names of students who have completed satisfactorily at least 12 credits of letter grades and who have a semester grade point average of 3.7 or above. No student who has received an F or U in an academic course will be eligible.

Kappa Omicron Nu seeks to promote graduate study and research and to stimulate scholarship and leadership toward the well-being of individuals and families. As a chapter of a national honor society in the New York State College of Human Ecology, it stimulates and encourages scholarly inquiry and action on significant problems of living—at home, in the community, and throughout the world.

Students are eligible for membership if they have attained junior status and have a cumulative average of not less than B. Transfer students are eligible after completing one year in this institution with a B average.

Current members of Kappa Omicron Nu elect new members. Not more than 10 percent of the junior class may be elected to membership and not more than 20 percent of the senior class may be elected. Graduate students nominated by faculty members may be elected. The president of Kappa Omicron Nu has the honor of serving as First Degree Marshall for the college during May commencement.

Bachelor of Science with Honors recognizes outstanding scholastic achievement in an academic field. Programs leading to a degree with honors are offered to selected students by the Department of Human Development and the Division of Nutritional Sciences. Information about admission to the programs and their requirements may be obtained from the appropriate department or division. Students in other departments who wish to qualify for honors should contact Janet Brown-Aist (N118A MVR) during their sophomore year or the first semester of their junior year. Most honors candidates have a minimum grade point average of 3.3 and have demonstrated potential for honors-level research. To graduate with honors a student must take approved courses in research methodology and evaluation, attend honors seminars, complete a written thesis, and successfully defend it in front of a committee.

Bachelor of Science with Distinction recognizes outstanding scholastic achievement. Distinction is awarded to students in the top 10 percent of the graduating class based on the last 60 credits earned at Cornell. The graduating class includes students who will complete requirements for Bachelor of Science degrees in January or May of the same academic year or the prior August. Names of seniors who meet these requirements are presented to the faculty of the college for approval.

The primary objectives of the honor society, **Phi Kappa Phi**, are to promote the pursuit of excellence in higher education and to recognize outstanding achievement by students, faculty, and others through election to membership. Phi Kappa Phi is unique in that it recognizes scholarship in all academic disciplines. To be eligible for membership students must rank in the top 10 percent of the senior class, or in the top 5 percent of the junior class. Provisions also exist for the election of faculty members and graduate students whose work merits recognition.

Gamma Sigma Delta is an honor society of the faculty in the colleges of Human Ecology, Agriculture and Life Sciences, and Veterinary Medicine. The common bond is promotion of excellence in work related to the quality of our environment and life based on "agriculture and the related sciences." The Cornell chapter recognizes the academic achievements of students, faculty, and alumni of those colleges with nominations for membership and with special awards. To be eligible, seniors must be in the upper 15 percent of their major. Five juniors with the highest grade point average in their college are also nominated.

Class Rank for the junior and senior classes is computed at the end of each semester. The college registrar processes class rank after final grades are issued and will not be adjusted if a student's academic record changes for any reason.

Awards

The Elsie Van Buren Rice Award in Oral Communication is awarded for original oral communication projects related to the college's mission by undergraduate students in the College of Human Ecology. The contest is held each year in February and awards prizes totaling $1,500.

The Flora Rose Prize is given biennially to a Cornell junior or senior whom, in the words of the donor, "shall demonstrate the greatest promise for contributing to the growth and self-fulfillment of future generations." The recipient will receive a cash prize of $500.

The Florence Halpern Award is named for the noted psychologist, Dr. Florence Halpern, in recognition of her lifelong interest in "innovative human service, which betters the quality of life." In that spirit the award is presented to a undergraduate in the College of Human Ecology who has demonstrated, through supervised field work or community service, creativity in the search for solutions to human problems. The award carries a $500 cash prize.

COLLEGE COMMITTEES AND ORGANIZATIONS

Student Groups and Organizations

Following are brief descriptions of some of the organizations that offer valuable experiences to human ecology students. Information about many other student activities on campus may be obtained from the Office of the Dean of Students (401 Willard Straight Hall).

The **American Council on Consumer Interests (ACCI)** offers a student membership for those interested in consumer economics. Contact the department of Consumer Economics and Housing for further information.

The **Cornell Design League** was formed to give students interested in apparel a chance to express their creativity outside of the classroom by producing a fashion show every spring. It has become concerned with all aspects of a professional presentation. Consequently, it also provides a creative outlet for those interested in graphics, photography, illustration, or theater production. Although many of its designers are part of the Department of Textiles and Apparel, the Design League welcomes people of all majors and schools.

Students have opportunities to work throughout the community in a variety of service capacities. They volunteer in day care centers, youth programs, health-related agencies, services for elderly people and people with disabilities, as well as nutrition programs, arts organizations, and Ithaca schools. For further information, contact the **Public Service Center** (200 Barnes Hall). Call 255–1148 for information about volunteer work or 255–1107 for information about work-study arrangements.

Gamma Sigma Delta is an honor society of the faculty in the colleges of Human Ecology, Agriculture and Life Sciences, and Veterinary Medicine. The common bond is promotion of excellence in work related to the quality of our environment and life based on agriculture and the related sciences. The Cornell chapter recognizes the academic achievements of students, faculty, and alumni of those colleges with nominations for membership and with special awards. To be eligible, seniors must be in the upper 15 percent of their major. Five juniors and sophomores with the highest grade average in their college are also nominated.

Human Ecology Ambassadors is a group of undergraduates who assist the Office of Admission, Student, and Career Services by participating in group conferences with prospective students to provide information from a student's perspective, assisting with recruitment and yield activities for potential students, conducting high school visitations, assisting with on-campus open-house programs for high school students and potential transfer students, helping with prospective students and alumni phonathons.

In addition, ambassadors attend regular meetings and serve as coordinators for activities in the Office of Admission, Student, and Career Services.

For information, contact the Office of Admission, Student, and Career Services (172 MVR, 255–5471).

The mission of the **Human Ecology Voices** is to build unity among students, faculty, and staff in the College of Human Ecology. Membership consists of all representatives of all other Human Ecology student organizations and other interested students. Patti Papapietro serves as Voices adviser from the Office of Admission, Student, and Career Services (172 MVR, 255–2532).

The **Human Ecology Mature Students Association** is an organization of students who are 24 years of age or older at the time of matriculation. Many mature students need to balance family, work, and other concerns with their academic efforts. The Mature Students Association strives to help by providing a forum for resource exchange and referral, support, socializing, and special projects depending upon expressed interest. These goals are pursued through seminars and informational meetings, the mature students listserv, supplementary orientation activities, liaison with other university offices, and the encouragement of informal networking. Contact Patti Papapietro in the Office of Admission, Student, and Career Services (172 MVR) for more information.

Students interested in the relationship between the physical environment and human behavior may join the **Human-Environment Relations Students Association (HERSA)**. For more information, contact the Department of Design and Environmental Analysis.

The **International Facility Managers Association (IFMA)** also has a student chapter. Membership information is available from the Department of Design and Environmental Analysis.

The **Association for Students of Color (ASC)** unites human ecology minority students to provide a supportive foundation for their enrollment, retention, graduation, and career placement. ASC members work toward these goals by:

- participating in admissions hosting programs and conducting high school visitations
- sponsoring presentations on career and graduate school outcomes of a human ecology education
- providing volunteer services to the Cornell and Ithaca communities,
- attending regular meetings and hosting annual fall and spring forums.

Contact Verdene Lee in the Office of Admission, Student, and Career Services (172 MVR, 255–2532) for more information.

The **Orientation Committee** consists of students and advisers interested in planning and implementing programs to acquaint new students with the College of Human Ecology. The committee is particularly active at the beginning of each semester and is always eager for new members. For information, contact Patti Papapietro in the Office of Admission, Student, and Career Services (172 MVR, 255–2532).

Membership in the **Sloan Student Association** is open to students interested in health care and related fields. Contact the president of the association (N222 MVR, 255–8013) for more information.

The **Students for Gerontology (SFG)** is composed of students from a wide variety of majors who are interested in career and internship opportunities that contribute to the well-being of our aging population. Programs sponsored by this organization focus on developing linkages with community organizations and other student gerontology groups. SFG meets monthly. Contact Donna Dempster-McClain, faculty adviser, Bronfenbrenner Life Course Center, (259 MVR Hall, 255–5557), for further information.

The **Undergraduate Nutrition Organization (UNO)** promotes nutritional well-being through education, communication, and research. Members of the student chapter organize programs such as Food and Nutrition Day in March, host on-campus speakers in nutrition and health-related fields, and publish NutriNews, a campus-wide nutrition newsletter. The student chapter is open to all students interested in nutrition education. For further information contact Gail Canterbury (302 MVR, 255–5473).

Committees and Councils

Several official organizations exist within the college to deal with matters of policy and to provide leadership in college planning. Most include elected student and faculty representatives; the actions of these various groups affect all students directly or indirectly.

The Educational Policies Committee (EPC) has two student members, one graduate and one undergraduate, who vote along with the faculty members on all matters relating to college academic policy. Recommendations are submitted to this committee regarding revisions in degree requirements, new curriculum changes, and new course approval.

Students also have the opportunity to serve on the **Admissions Policy Subcommittee**, and the **Academic Integrity Hearing Board**.

The Selection Committee for the Chancellor's Award for Excellence in Teaching or Professional Service handles the nomination and selection process for this prestigious yearly award. The committee consists of three teaching faculty members, one professional staff member, and three undergraduate members.

The **Human Ecology Alumni Association Board of Directors** includes two student board members—one junior and one senior. One student is selected each spring to begin a two-year term as student representative. The two students co-chair the board's Student Activities Committee, which works to increase the visibility of the Alumni Association among the student body by funding a variety of activities. The student members also bring an important perspective to board deliberations about programming and annual goals.

The Committee on Academic Status does not include student representatives, but has a faculty representative from each department. This committee is responsible for upholding the academic standards of the college and takes action when appropriate. The committee also hears appeals regarding student petitions and requests to be readmitted.

INTERDEPARTMENTAL COURSES

HE 100 Critical Reading and Thinking
Fall, spring, or summer. 2 credits. Enrollment limited. Priority is given to freshmen and sophomores; juniors and seniors are admitted with permission of the instructor. Letter or S-U grades.
The objective of this course is to enable students to increase critical reading and thinking abilities. Theory and research associated with a wide range of reading, thinking, and learning skills are examined. Emphasis is placed on developing and applying analytical and evaluative skills. Laboratory instruction is individualized and provides the opportunity to focus intensively on increasing comprehension, reading rate, and vocabulary.

HE 101 College Achievement Seminar
6-week summer session. 2 credits. Enrollment limited to and required of pre-freshman Summer Program students. Letter or S-U grades.
The objective of this course is to improve the study and learning skills of incoming freshmen. Emphasis is placed on acquisition of skills necessary to achieve academic success. Topics include time management, note-taking, mapping, textbook comprehension, exam preparation, and exam strategies. The application of theory to the demands of Cornell course work is stressed. In addition, students are introduced to library and

computing resources through hands-on projects.

THE URBAN SEMESTER PROGRAM IN MULTICULTURAL DYNAMICS IN URBAN AFFAIRS

Cornell in New York City provides students with many study options that focus on multicultural dynamics in urban affairs. The options available include internships, individual and group community service projects, research, independent study, collaborative learning, and mentorships. Students must enroll concurrently in the three courses, HE 470, HE 480 and HE 490. Students learn through reflection and action. Program options are possible throughout the academic year, during winter break, and in the summer.

Courses of study enable students to seek out the relationship between theory and practice, apply theory to practice, identify and acquire professional practice skills, and learn about the impact of diversity on New York City. By applying ethnographic research techniques and methods, students learn to think conceptually, reflect on their actions, and be agents of change.

Several majors in the college require internships or encourage field study. Check with the Director of Undergraduate Studies of each major for more information. The Career Development Center in 159 MVR and counselors in the Office of Admission, Student, and Career Services in 172 MVR can help you find internships and provide more information on departmental opportunities and enrolling in Cornell in New York City.

HE 470 Multicultural Practice
Fall and spring semesters.
Students immerse themselves in internship activities three days each week. During small group seminars, students reflect on their internship experiences, focusing on multicultural issues, professional practice, and organizational culture.

HE 480 Multicultural Issues in Urban Affairs
Fall and spring semesters.
This course is a study of multicultural issues in urban affairs. It occurs as students enhance their academic foundations and their career development. Using a historical perspective, students examine issues of diversity (e.g., race, ethnicity, religion, class, gender, sexual orientation) in relationship to (1) professional life in different sectors of the economy; (2) the development of neighborhoods and communities; and (3) the basis of a just and democratic society. Reading focuses on inner-city children and youth under a variety of multiculturally-influenced conditions and contexts. Costs include travel to and from sites by public transportation at about $3.00–6.00 each week.

HE 490 Communities in Multicultural Practice
Fall and spring semesters.
This course provides students with an understanding of community building processes and enables them to interact with children, youth, and their families in school settings. For a full day once each week, students work in inner city schools with teachers, staff, and children, providing community service. Student learning is focused on how to increase children's learning capacities and expand their horizons by teaching them to envision success. Students focus on the assets that inner city children bring to their school environment and learn how to mentor them. They help teach skills, knowledge, values, behaviors, and perspectives that school children must develop in order to enter the working world. Costs include public transportation costs to and from the various sites, about $3.00–6.00 each week.

HE 402 The Winter Session in Community Service and Mutual Learning: The South Bronx-Banana Kelly/Cornell University Project in Community Building
Winter Session.
Over the course of two intensive weeks, students participate in an ongoing community service project in the South Bronx with children of the Banana Kelly community. In carrying out community service, students participate with the director of the Cornell in New York City Program. Since the 1995 intersession, students have mentored children in an after-school program through projects that have documented the community with photographs, models, and stories. Each intersession, seven students mentor 15 ninth graders from Banana Kelly High School.

A photo exhibit was produced and circulated. In 1998, Cornell students and children produced three-dimensional models of their imagined community in future years and a book of essays and photographs.

HE 406 Fieldwork in Diversity and Professional Practice
Summer session.
Over the course of an eight-week summer session, students participate in a community-based medical center, hospital or clinic a member of the New York Presbyterian Hospital and Weill College of Medicine of Cornell University. This is a four-day internship and one day of seminars and site visits.

DESIGN AND ENVIRONMENTAL ANALYSIS

F. Becker, chair; W. Sims, director of undergraduate studies; S. Danko, director of graduate studies; A. Basinger, J. Elliott, P. Eshelman, G. Evans, K. Gibson, R. Gilmore, A. Hedge, J. Jennings, J. Laquatra, L. Maxwell

Note: A minimal charge for photocopied course handouts may be required.

Note: Class meeting times are accurate as of the time of publication. If changes are necessary, the department will provide new information as soon as possible.

DEA 4+1 Masters Degree Program

Outstanding students who complete their four year undergraduate degree in DEA are eligible to complete a Master of Arts/ M.A (Interior Design) or a Master of Science/M.S. (Human Environment Relations) degree in one additional year of graduate study.

Through careful planning many of the courses required in the M.A. or M.S. programs can be taken during the undergraduate years, creating an opportunity to focus the fifth year of study on completing course and thesis requirements. As early as the freshman year, students can plan their curriculum toward completing a fifth year masters. Typically, this means students will take 4 to 5 courses in their fall term as a graduate student, and 2 to 3 courses plus their thesis research in the spring term. Students should expect to complete their thesis by the end of the summer term of their fifth year.

Admission to the 4+1 Masters program is not automatic. Students must meet with their advisers early in their undergraduate programs to plan carefully for this possibility. In the fall of the senior year, interested students must submit an application to the Graduate School. The GRE exam is not required for admissions, but students must submit a statement of intent, letters of reference, and transcripts. Students who have compiled a strong undergraduate record in the department are usually good candidates for admission into the graduate program in Design and Environmental Analysis. Students interested in this program should meet with their DEA adviser as early as possible to discuss and plan for application to this program.

DEA 101 Design Studio I
Fall. 3 credits. Each section limited to 20 students. Permission of instructor required for non-DEA majors. Priority given to interior design majors. Option I majors must take DEA 101 in fall of their first year. Approximate cost of materials, $200. M W 1:25–4:25; or T R 10:10–1:10. J. Elliott.
This studio course introduces the fundamental vocabulary and principles of two- and three-dimensional design. Students experiment with the development of image and form through problem-solving activities. Visit http://instruct1.cit.cornell.edu/courses/dea101/.

DEA 102 Design Studio II
Spring. 3 credits. Limited to Option I DEA majors only. B– or higher in DEA 101 required to register for this course. Option I majors must take DEA 102 and 115 concurrently. Approximate cost of materials, $200; shop fee, $10. T R 1:25–4:25. P. Eshelman.
A studio course in three-dimensional design with an interior design emphasis. Problems in spatial organization are explored through drawings and models.

DEA 111 Making a Difference: By Design
Fall. 3 credits. Limit 130. Lab Fee: $25. M W F 11:15–12:05. S. Danko.
Students from any academic area may examine how design affects their daily lives and future professions. This course focuses on issues of leadership, creative problem-solving, and risk-taking through case study examination of leaders in business, education, medicine, human development, science, and other areas who have made a difference using design as a tool for positive social change. Utilizing a micro to macro framework, students explore the impact of design from the person to the planet. Additional topics include: nurturing innovation, visual literacy, design criticism, design and culture, semiotics, proactive/reflective decision making, and ecological issues.

DEA 115 Design Graphics
Spring. 3 credits. Option I DEA majors only. Prerequisite: DEA 101; must take DEA 102 and DEA 115 concurrently. Minimum cost of materials, $100; technology fee $10. M W F 9:05–11:00. K. Gibson.
A studio drawing course for interior designers. Discussion groups on drawing techniques are held to develop a visual understanding and vocabulary. Students are introduced to the functions of line, shape, and value. Perspective, spatial, and conceptual drawing are emphasized.

DEA 150 Introduction to Human-Environment Relations
Spring. 3 credits. M W F 12:20–1:10. G. Evans.
This course analyzes environment and human behavior. We examine the interface of social and environmental sciences with application for the design and management of built and natural habitats. Topics include environmental effects on health, well-being, moods, aesthetics, performance, interpersonal relationships, and organizational effectiveness as well as the ecological consequences of human attitudes and behaviors. Visit our web site at instruct1.cit.cornell.edu/courses/dea150.

DEA 201 Design Studio III
Fall. 4 credits. Limited to Option I DEA students. Prerequisites: DEA 101,102, and 115 (minimum grades of B–) Recommended: DEA 111 and 150. Coregistration in DEA 251 is required. Minimum cost of materials, $150; lab fee, $40; optional field trip, approximately $120. M W F 1:25–4:25. J. Jennings.
This is the third semester in the studio sequence of eight semesters. The theme and objectives focus on design as critical thinking, introducing means by which students can think, draw, write, and build their way critically through design. Taken concurrently with DEA 251, the course applies historical and theoretical knowledge to design projects. The course also includes a collaborative project with a professor and students from another design discipline.

DEA 202 Design Studio IV
Spring. 4 credits. Each section limited to Option I DEA students. Prerequisites: DEA 201 and 203. Prerequisites or corequisites: DEA 204. Minimum cost of materials, $120; diazo machine fee, $8; field trip fee. T R 12:20–4:25. R. Gilmore.
Interior design studio. Emphasis of the course is on continued development of basic proficiency in design skills through exposure to a selected set of interior design problems of limited complexity. Each problem of three to five weeks duration is structured to emphasize different aspects of the design process.

DEA 203 Digital Communications
Fall. 2 credits. Priority given to DEA majors. Lab fee $10. Sec 01 M 7:30–9:55 P.M., sec 02 W 7:30–9:55 P.M. J. Elliott.
Digital information technologies for designers of the built environment. Students explore issues in relation to text and image and form and content through a series of weekly projects. They work towards the development of a professional web-based portfolio of self-promotional materials. The primary course objective is to reinforce principles of visual communications while learning the rudiments of vector, raster, and html graphic software. Visit http://instruct 1.cit.cornell.edu/courses/dea203/

DEA 204 Introduction to Building Technology
Spring. 2 credits. M 2:30–4:25. W. Sims.
Introduction to building technology for interior designers and facility managers. Emphasis is placed on developing basic understanding of buildings and building systems and their implications for interior design and facility management. Covers basic building types; structural systems; construction materials and methods; HVAC systems; plumbing, electrical, lighting, fire, and security systems; and telephone, computer, and other communication systems. Visit http://courseinfo.cit.cornell.edu/courses/dea204.

[DEA 243 Inside Out: The American Everyday Interior (also WOMNS 243, AM ST 243)
Spring (odd-numbered years). 3 credits. Limited to 65. S-U option. T R 10:10–11:15. Offered 2003. J. Jennings.
A study of late nineteenth and twentieth-century everyday interiors in socio-cultural contexts, with an emphasis on design dissemination, consumer patterns, and gender issues. Topics include women's walls, power in the parlor, photographs as a mirror, and the love of the colonial.]

DEA 250 The Environment and Social Behavior
Fall. 3 credits. Limited to 16. Priority order: DEA seniors, juniors, sophomores, freshmen. Prerequisite: DEA 150 and written permission of instructor. Field trip fee $65. T R 2:55–4:10. G. Evans.
A combination seminar and lecture course for students interested in the social sciences, design, or facility management. Through projects and readings the influence of environmental form on social behaviors such as aggression, cooperation, communication, community, and crime is explored. Also covered are the influences of stage in life cycle, family structure, and social class on environmental needs and purposes. Implications for the planning, design, and management of complex environments such as offices, hospitals, schools, and housing are emphasized.

DEA 251 History and Theory of the Interior
Fall. 3 credits. Limited to 65. Priority given to DEA majors. M W F 9:05–9:55. J. Jennings.
An historic study of interior architecture and design with an emphasis on the concepts of design theory. Overarching themes encompass several time periods from the classical to the twentieth century and isolate cultural patterns, spatial ideas, dialectics, design elements, and theorists. Reading, discussion, analytical exercises, essays, examinations, and a field trip will be included. Visit http://instruct1.cit.cornell.edu/courses/dea251/.

DEA 300 Special Studies for Undergraduates
Fall or spring. Credit to be arranged. Department faculty.
Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multicopy description of the study they want to undertake on a form available from the College Registrar's Office. The form, signed by both the instructor directing the study and the head of the department, is filed at course registration or during the change-of-registration period.

DEA 301 Design Studio V
Fall. 4 credits. Prerequisites: DEA 111, 150, 201, 202, 203, and 204. Corequisite: DEA 303 and 459. Minimum cost of materials, $150; shop fee, $10; optional field trip, approximately $10. T R 12:20–4:25. P. Eshelman.
Intermediate-level interior design studio. The course is organized around a series of interior and interior-product design problems of intermediate-level complexity, three to five weeks in duration. Focus is on development of design skills and on understanding of a selected set of generic problem types.

DEA 302 Design Studio VI
Spring. 5 credits. Prerequisites: DEA 301 and 303 or permission of instructor. Corequisite: DEA 305. Minimum cost of materials, $150; shop fee, $10. M W F 1:25–4:25. K. Gibson.
Intermediate-level interior design studio with an introduction to computer applications. Emphasis on using the microcomputer as a design tool in the process of creating and planning interior spaces. Continued development of design skills and problem solving in relation to a selection of problem types.

DEA 303 Introduction to Furnishings, Materials, and Finishes
Fall. 2 credits. W 2:30–4:25. R. Gilmore.
Basic understanding of furniture types and systems; interior products and equipment such as work-stations; window, wall, and floor coverings; ceiling and lighting systems; and materials and finishes. Emphasis is placed on criteria for selection of furnishings, materials, and finishes for typical interior design and facility management problems.

DEA 304 Introduction to Professional Practice of Interior Design
Spring. 1 credit. W 2:30–4:25. A. Basinger.
Introduction to organizational and management principles for delivery of interior design and facility management services. Covers basic organizational structures and basic management functions within interior design and facility management organizations, work flow and scheduling, business practices, legal and ethical responsibilities and concerns, contracts, basic contract documents such as working drawings and specifications, supervision of construction and installation, and cost estimation.

DEA 305 Construction Documents and Detailing
Spring. 2 credits. Prerequisites: DEA 301 and DEA 303. Corequisite: DEA 302. Minimum cost of materials $50. Field trips, $50. F 9:05–11:00. R. Gilmore.
Comprehensive study of drafting, detailing, schedules, and specifications. Emphasis on drawing conventions, symbols, dimensioning, detailing of interior elements, terminology, construction methods, and materials.

DEA 325 Human Factors: Ergonomics–Anthropometrics
Fall. 3 credits. Recommended: DEA 150. T R 8:40–9:55. A. Hedge.
Implications of human physical and physiological characteristics and limitations on the design of settings, products, and tasks. An introduction to engineering anthropometry, biomechanics, control/display design, work physiology, and motor performance. Course

includes practical exercises and field project work.

DEA 350 Human Factors: The Ambient Environment
Spring. 3 credits. Recommended: DEA 150. T R 8:40–9:55. A. Hedge.
An introduction to human-factor considerations in lighting, acoustics, noise control, indoor air quality and ventilation, and the thermal environment. The ambient environment is viewed as a support system that should promote human efficiency, productivity, health, and safety. Emphasis is placed on the implications for planning, design, and management of settings and facilities. Course includes a field project.

DEA 400–401–402–403 Special Studies for Undergraduates
Fall or spring. Credits to be arranged. S-U grades optional. Department faculty.
For advanced independent study by an individual student or for study on an experimental basis with a group of students in a field of DEA not otherwise provided through course work in the department or elsewhere at the university. Students prepare a multicopy description of the study they want to undertake on a form available from the department office. This form must be signed by the instructor directing the study and the department head and filed at course registration or within the change-of-registration period in 145 MVR, College Registrar's Office, along with an add/drop slip. To ensure review before the close of the course registration or change-of-registration period, early submission of the special studies form to the department head is necessary. Students, in consultation with their advisers and the instructor should register for one of the following subdivisions of independent study.

DEA 400 Directed Readings
For study that predominantly involves library research and independent reading.

DEA 401 Empirical Research
For study that predominantly involves data collection and analysis or laboratory or studio projects.

DEA 402 Supervised Fieldwork
For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

DEA 403 Teaching Apprenticeship
For study that includes teaching methods in the field and assisting faculty with instruction. Students must have demonstrated a high level of performance in the subject to be taught and in the overall academic program.

DEA 407 Design Studio VII
Fall. 5 credits. Prerequisites: DEA 302, DEA 303, DEA 304, and DEA 305. Minimum cost of materials, $150. Field trip $50. T R 12:20–4:25. R. Gilmore.
Advanced interior design studio organized around a series of interior design problems, three to five weeks in duration. Focus is on development of design skills and on competence in solving a selected set of generic interior design problem types.

DEA 408 Design Studio VIII
Spring. 5 credits. Prerequisites: DEA 301, 302, 303, and 304. Minimum cost of materials, $150. T R 12:20–4:25. S. Danko.
Design problem-solving experiences involving completion of advanced interior design problems. Problems are broken into five phases: programming; schematic design and evaluation; design development, including material and finish selection; design detailing; and in-process documentation and the preparation of a professional-quality design presentation.

DEA 422 Ecological Literacy and Design (also ARCH 464.02)
Spring. 3 credits. Letter grade only. Field trips approximately $25. T R 10:10–11:40. J. Elliott.
This is a lecture/seminar course for students interested in learning about the effects of designing the built environment of the biophysical world. Course objectives are to develop sensitivities to environmental issues, construct conceptual frameworks for analysis, and demonstrate how ecological knowledge can be applied to the practice of design through participatory approaches to learning. Visit http://instruct1.cit.cornell.edu/courses/dea422/.

DEA 430 Furniture as a Social Art
Spring. 3 credits. Limited to 15. Permission of instructor. Cost of building materials: $150. Students must also sign up for 2 hours of DEA shop time each week for model building. M W 9:05–11:00. P. Eshelman.
This course examines furniture as a design process that emphasizes support of human behavior. Information about specific social issues including health care, aging, child care, and education is the starting point for assignments. Students analyze products currently available and design new furniture. Also covered are furniture materials, fabrication processes, and manufacturing techniques.

DEA 443 Cultural Construction: The Nineteenth- and Twentieth-Century American Interior
Spring (even-numbered years). 3 credits. Enrollment limited to 15 students. S-U option. Field trips $50. T R 10:10–11:30. Next offered spring 2004. J. Jennings.
A topical study of nineteenth- and twentieth-century American vernacular interiors, exploring the relationship between interior design theory and social and cultural values. Sources include historic interiors, literature and art, and architectural and material culture studies. The course includes reading, discussion, comparative analysis, and critical writing.

DEA 451 Seminar on Facility Planning and Management
Fall. 1 credit. Letter grades only. M 3:35–4:25. F. Becker, W. Sims.
Series of seminars led by Cornell faculty and other facility management professionals. Topics include strategic space planning, space standards, office automation, project management, energy conservation, environmental protection, and regulatory issues. Visit http://instruct1.cit.cornell.edu/courses/dea/451_659.

DEA 453 Planning and Managing the Workplace
Spring. 3 credits. Prerequisite: limited to juniors and seniors. Purchase of course packet required. M 7:30–10:30 P.M. F. Becker.
Intended for students interested in the planning, design, and management of facilities for complex organizations. The purpose of the course is to explore how characteristics of the workplace, including building, design, furniture and equipment, and policies governing their use and allocation, affect individual and organizational effectiveness. Special topics, such as the human implications of new information technologies and work at home, are also covered. Visit http://instruct1.cit.cornell.edu/courses/dea/453_653.

DEA 454 Facility Planning and Management Studio
Spring. 4 credits. Prerequisite: DEA 459 or permission of instructor. Letter grades only. Minimum cost of materials, $200. T R 1:25–4:25. W. Sims.
For advanced undergraduates interested in facility planning and management. Purpose is to provide basic tools, techniques, and concepts useful in planning, designing, and managing facilities for large, complex organizations. The course covers strategic and tactical planning for facilities, organizing to deliver facility management services, project management, space forecasting, space allocation policies, programming, relocation analysis, site selection, building assessment, space planning and design, furniture specifications, and moves. Sociopsychological, organizational, financial, architectural, and legal factors are considered. Visit http://instruct1.cit.cornell.edu/courses/dea/454_654.

DEA 455 Research Methods in Human–Environment Relations
Fall. 3 credits. Prerequisites: DEA majors only or permission of instructor, and a statistics course. M W F 1:25–2:15. G. Evans.
The course develops the student's understanding and competence in the use of research and analytical tools to study the relationship between the physical environment and human behavior. Emphasis is placed on selection of appropriate methods for specific problems and the policy implications derived from research. Topics include research design, unobtrusive and obtrusive data-collecting tools, the processing of qualitative and quantitative data, and effective communication of empirical research findings.

DEA 459 Programming Methods in Design
Fall. 3 credits. Letter grade only. Minimum cost of materials $100. T R 10:10–11:25. W. Sims.
Introduction to environmental programming. Emphasis on formulation of building requirements from user characteristics and limitations. Diverse methods for determining characteristics that will enable a particular environmental setting to support desired behaviors of users and operators. Methods include systems analysis, soft system, behavior circuit, behavior setting, and user characteristic approaches. Selection of appropriate methods to suit problems and creation of new methods or techniques are emphasized. Visit http://instruct1.cit.cornell.edu/courses/dea/459_650.

DEA 470 Applied Ergonomic Methods
Spring. 3 credits. Prerequisite: DEA 325. T R 2:55–4:10. A. Hedge.
This course covers ergonomics methods and techniques and their application to the design of modern work environments. Emphasis is placed on understanding key concepts. Coverage includes conceptual frameworks for

ergonomic analysis, systems methods and processes, a repertoire of ergonomics methods and techniques for the analysis of work activities and work systems. This course is the undergraduate section of DEA 670, which will share the same lectures but will meet for an additional hour. DEA 670 will have additional readings and projects.

DEA 499 Senior Honors Thesis
Fall or spring. Variable credit. Prerequisite: permission of thesis advisor and DEA director of undergraduate studies. Letter grades only.
This is an opportunity for DEA majors to undertake original research and scholarly work leading to the preparation of a thesis. Students work closely with their thesis adviser on a topic of interest.

DEA 600–603 Special Problems for Graduate Students
Fall or spring. Credit to be arranged. S-U grades optional. Department faculty.
Independent advanced work by graduate students recommended by their special committee chair and approved by the head of the department and instructor.

600: Special Problems. For study of special problems in the areas of interior design, human environment relations, or facilities planning and management.

601: Directed Readings. For study that predominantly involves library research and independent study.

602: Graduate Empirical Research. For study that predominantly involves collection and analysis of research data.

603: Graduate Practicum. For study that predominantly involves field experiences in community settings.

DEA 643 Cultural Construction: The Nineteenth- and Twentieth-Century American Interior
Spring (even-numbered years). 4 credits. Enrollment limited to 15 students. S-U option. Field trips $50. T R 10:10–11:30. Next offered spring 2004. J. Jennings.
A course intended for graduate students who want a more thorough grounding in the history of vernacular interiors than is provided by DEA 443. Each student is required to attend DEA 443 lectures, meet with the instructor and other graduate students for an additional class hour each week, and do additional readings and projects.

DEA 645 Dancing Mind/Thinking Heart: Creative Problem-Solving Theory and Practice
Spring. 3 credits. Limited to 15 graduate and advanced undergraduate students. Prerequisite for undergraduates: permission of instructor. T 4:30–7:30. S. Danko.
Focuses on thinking processes and techniques that support creative problem solving. Theories of creative behavior and critical thinking are examined. The course is highly participatory and experiential by design. Weekly discussions include hands-on applications of theories on short problems tailored to the backgrounds of the students. The primary goal is to demonstrate perceptual, emotional, intellectual, cultural, and environmental blocks to creative thinking and expand the student's repertoire of creative problem solving strategies for use in day-to-day professional practice. Case studies of creative individuals and organizations from a variety of fields are presented.

DEA 648 Advanced Applications in Computer Graphics
Fall. 3 credits. Limited to 18 graduate and advanced undergraduate students. Prerequisites for undergraduates: DEA 302 or permission of instructor. Minimum cost of materials $150. Lab fee $35. T R 9:05–12:05. K. Gibson.
Advanced use of computer technology to create and analyze interior environments. Emphasis will be on the use of 3-D modeling, animation, photorealistic rendering, and emerging technologies to investigate dynamic design issues.

DEA 650 Programming Methods in Design
Fall. 4 credits. T R 10:10–11:25. W. Sims.
A course intended for graduate students who want a more thorough introduction to environmental programming methods than is provided by DEA 459. Each student is required to attend DEA 459 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. See DEA 459 for more detail.

DEA 651 Human Factors: Ergonomics-Anthropometrics
Fall. 4 credits. Recommended: DEA 150 and a 3-credit statistics course. T R 8:40–9:55. A. Hedge.
A course intended for graduate students who want a more thorough grounding in human factors than is provided by DEA 325. Each student is required to attend DEA 325 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. See DEA 325 for more detail.

DEA 652 Human Factors: The Ambient Environment
Spring. 4 credits. Recommended: DEA 150. T R 8:40–9:55. A. Hedge.
A course intended for graduate students who want a more thorough grounding in human factors considerations than is provided by DEA 350. Each student is required to attend DEA 350 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. For detailed description, see DEA 350.

DEA 653 Planning and Managing the Workplace
Spring. 4 credits. Letter grades only. Purchase of course packet required. M 7:30–10:30 P.M. F. Becker.
Intended for graduate students who want a more thorough grounding in the planning, design, and management of facilities for complex organizations than is provided by DEA 453. Each student is required to attend DEA 453 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. See DEA 453 for more detail.

DEA 654 Facility Planning and Management Studio
Spring. 4 credits. Prerequisite: DEA 459/650 or permission of instructor. Letter grades only. Minimum cost of materials, $200. For graduate students in facility planning and management. T R 1:25–4:25. W. Sims.
For description, see DEA 454.

DEA 656 Research Methods in Human-Environment Relations
Fall. 4 credits. Prerequisites: DEA majors only or permission of instructor, and a statistics course. M W F 1:25–2:15. G. Evans.
Intended for graduate students who want a more thorough understanding of the use of research to study the relationship between physical environment and human behavior than is provided by DEA 455. Each student is required to attend DEA 455 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. See DEA 455 for more detail.

DEA 659 Seminar on Facility Planning and Management
Fall. 1 credit. For graduate students interested in careers in facility planning and management. Letter grades only. M 3:35–4:25. F. Becker, W. Sims.
Series of seminars led by Cornell faculty members and other professionals directly involved in facility planning and management. Topics include strategic and tactical facility planning, space standards, project management, computer and facility management, facility maintenance and operations, energy conservation, and building systems. Visit http://instruct1.cit.cornell.edu/courses/dea451_659.

DEA 660 The Environment and Social Behavior
Fall. 4 credits. Prerequisite: DEA 150 and written permission of instructor. Field trip fee $65. T R 2:55–4:10. G. Evans.
Intended for graduate students who want a more thorough understanding of the influence of environmental form on social behavior than is provided by DEA 250. Each student is required to attend DEA 250 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. See DEA 250 for more detail.

DEA 668 Design Theory Seminar
Spring. 3 credits. Enrollment limited to 25 students. T R 10:10–11:40. J. Jennings.
Directed toward advanced undergraduate and graduate students with interest in the theory of design. The purpose is to provide an understanding of major theoretical ideas underlying design movements of the twentieth century. Explores these ideas through readings, lectures by faculty and visitors, student presentations of research papers, and seminar discussions. Visit http://instruct1.cit.cornell.edu/courses/dea668.

DEA 670 Applied Ergonomics Methods
Spring. 4 credits. Enrollment limited to 20. Prerequisite: DEA 651. T R 2:55–4:10. A. Hedge.
Intended for graduate students who want a more thorough understanding of applied ergonomics methods than is provided by DEA 470. Each student is required to attend DEA 470 lectures, meet with the instructor and other graduate students for an additional class each week, and complete additional readings and projects. See DEA 470 for more detail.

DEA 899 Master's Thesis and Research
Fall or spring. Credits to be arranged. Prerequisite: permission of the chair of the graduate committee and the instructor. S-U grades optional. Department graduate faculty.

HUMAN DEVELOPMENT

J. Eckenrode, chair; S. Cornelius, director of graduate studies; J. Haugaard, director of undergraduate studies; C. Anderson, U. Bronfenbrenner, J. Brumberg, M. Casasola, S. Ceci, M. Cochran, D. Dempster-McClain, R. Depue, J. Doris, J. Garbarino, K. Greene, S. Hamilton, C. Hazan, B. Koslowski, L. C. Lee, B. Lust, P. Moen, K. Pillemer, H. Ricciuti, S. Robertson, J. Ross-Bernstein, R. Savin-Williams, Q. Wang, E. Wethington, W. Williams

NOTE: Class meeting times are accurate as of the time of publication. If changes are necessary, the department will provide new information as soon as possible.

HD 115 Human Development
Fall or summer. 3 credits. S-U grades optional. M W F 1:25–2:15. C. Schelhas-Miller.
Provides a broad overview of theories, research methods, and current knowledge of human development from conception into adulthood. Course material covers infancy, childhood, and adolescence. Topics include biological, intellectual, linguistic, social, and emotional development as well as the cultural, social, and interpersonal contexts that affect the developmental processes and outcomes of these domains.

HD 116 Exploring Human Development
Fall. 1 credit. Letter grades only. Limited to Human Development freshmen. TBA. HD faculty.
This course is a series of small group discussions with HD freshmen and a HD faculty member. Each faculty member will set the topics and style of discussion. Discussion groups will meet one hour a week, each week of the fall semester. No exams will be given. Grading will be done on attendance, participation, and short written assignments.

HD 216 Human Development: Adolescence and Youth
Spring. 3 credits. Prerequisite: HD 115 or Psychology 101 or permission of instructor. S-U grades optional. T R 11:40–12:55. C. Schelhas-Miller.
Provides a broad overview of theories, research, and issues in the study of human development from early to late adolescence (youth). Attention is focused on the major biological, cognitive, and social changes during adolescence; the psychosocial issues of adolescence, including identity, autonomy, intimacy, sexuality, achievement, and problems; and the contexts in which adolescent development occurs, particularly families, peer groups, schools, work, and popular culture. Empirical research, theories, case studies of the lives of real adolescents, and, to a lesser degree, public policies are discussed.

HD 218 Human Development: Adulthood and Aging
Spring. 3 credits: Prerequisite: HD 115. S-U grades optional. T R 11:40–12:55. S. Cornelius.
Provides a general introduction to theories and research in adult development and aging. Psychological, social, and biological changes from youth through late adulthood are discussed. Both individual development within generations and differences among generations are emphasized.

HD 230 Cognitive Development
Spring. 3 credits. S-U grades optional. Prerequisites: HD 115 or Psychology 101. T R 11:40–12:55. Q. Wang.
This course surveys theories and research in perceptual and cognitive development from infancy through adolescence. Extensive coverage of infant perception, cognition, and learning during the first two years of life forms the foundation of the course. Significant linkages between brain development and behavioral development are covered when possible. Language, memory, concepts, and problem solving are covered in the second half of the semester. The course is intended to serve as a foundation for more advanced study in cognitive development, but also as an overview for students whose primary interests lie in other areas.

HD 233 Children and the Law
Fall. 3 credits. Prerequisites: HD 115 and an introductory statistics course. W 2:30–5:00. Staff.
This course examines psychological data and theories that shed light on the practical issues that arise when children enter the legal arena. It attempts to integrate theories, research, and methodology from several areas of psychology including, developmental, cognitive, social, and clinical. This course also attempts to examine the degree to which basic research can (and should) be used to solve applied issues. The topic of children and the law provides an opportunity to meet all these requirements. Rapid changes involving child witnesses in our legal system have forced social scientists to bring their work into the courtroom. At the same time, bringing this fray into the legal system has changed the course of research and thinking about certain aspects of child development and cognition: it has encouraged researchers to tackle new issues and to develop innovative experimental paradigms. Selected topics to be covered include: memory development, suggestibility, theory of mind, childhood amnesia, expectancy formation, symbolic representational ability, and finally, what can (or should) an expert witness tell the court. Several actual cases involving child witnesses will be presented to illustrate the application of scientific data to the courtroom. Because of the heavy use of case materials; video and textual coverage of actual trials, it is expected that students will devote more than the usual number of hours to this course.

[HD 241 History of Childhood in the United States (also HIST 271, AM ST 241)
Spring. Recommended for sophomores and juniors. 3 credits. M W 8:40–9:55. Not offered 2001–2002. J. Brumberg.
An examination of childhood and adolescence in various historical contexts: Puritan New England, slave plantations, evangelical revivals, the Western frontier, Victorian families, reform schools, early high schools and colleges, the sexual revolution of the 1920s, immigrant communities, the Depression and World War II, the 1950s, and more recent social and cultural changes affecting families. Students will evaluate continuities and changes in the lives of American children as well as changing scientific ideas about children. Students have an opportunity to reflect on and write about their own childhood and adolescence. This course is designed to give students a humanities perspective on approaches to childhood.]

HD 242 Participation with Groups of Young Children
Fall or spring. 4 credits. Limited to 20 students (limit depends on availability of placements and of supervision). Prerequisites: HD 115 and permission of instructor. S-U grades optional. W 1:25–3:30. J. Ross-Bernstein.
This course is designed to integrate developmental theories with supervised experience in child care centers, the intention being to enhance the student's abilities to understand and to relate effectively to young children. This class involves participation, observation, reflection, reading, writing, and sharing of viewpoints. Placements are in local nursery schools, day care centers, Head Start programs, and kindergartens.

HD 250 Families and the Life Course (also SOC 250)
Spring. 3 credits. S-U grades optional. M W 2:55–4:10. E. Wethington.
This course provides an introduction to social scientific research on family roles and functions in American society. Topics include the history of the family, family change over the life course, and the influence of cultural and economic forces on families.

HD 251 Social Gerontology: Aging and the Life Course
Spring. 3 credits. Limited to 60 students. Strongly recommended: HD 250 or equivalent to be determined by instructor. S-U grades optional. T R 8:40–9:55. D. Dempster-McClain.
This course analyzes the social aspects of aging in contemporary American society from a life course perspective. Topics to be covered include: (1) an introduction to the field of gerontology, its history, theories, and research methods; (2) a brief overview of the physiological and psychological changes that accompany aging; (3) an analysis of the contexts (such as family, friends, social support, employment, volunteer work) in which individual aging occurs, including differences of gender, ethnicity, and social class.; (4) and the influences of society on the aging individual. Guest speakers will provide an introduction to various careers in the field of gerontology.

HD 253 Gender and the Life Course (also WOMNS 253)
Fall. 3 credits. S-U grades optional. M 7:30–10:00 P.M. T. Mitrano.
We will examine the complex interplay between gender and age as well as the social construction of the life course. Students explore the relationship between social change and individual lives, observing the significance of two key institutions—work and family—in shaping basic life choices and their consequences throughout the life course. Implications of key life trajectories and transitions for individual lives and for social policy will also be discussed.

[HD 258 History of Women in the Professions, 1800 to the Present (also WOMNS 238 and HIST 238, AM ST 258)
Fall. 3 credits. S-U grades optional. Human ecology students must register for HD 258. Not offered 2001–2002. J. Brumberg.
The historical evolution of the female professions in America (midwifery, nursing, teaching, librarianship, home economics, and social work) as well as women's struggles to gain access to medicine, law, and the

sciences. Lectures, reading, and discussions aim to identify the cultural patterns that fostered the conception of gender-specific work, and the particular historical circumstances that created these different work opportunities. The evolution of "professionalism" and the consequences of professionalism for women, family structures, and American society are also discussed.]

HD 260 Introduction to Personality (also PSYCH 275)

Spring. 3 credits. Recommended: introductory course in psychology or human development. T R 1:25–2:40. D. Bem.

This course is designed as an introduction to theory and research in the area of personality psychology, with special emphasis on personality development. It covers the major influences—including genetic, environmental, and gene-environment interactions—and involves in-depth study of the major theories. The assumptions and models of human behavior that form the basis of each theoretical orientation will be examined and compared, and the relevant empirical evidence reviewed and evaluated. In addition, basic psychometric concepts and the methods for measuring and assessing personality will be covered, as will the major related debates and controversies.

[HD 261 The Development of Social Behavior

Spring. 3 credits. Strongly recommended: HD 115 or Psychology 128. Offered alternate years. Not offered 2001–2002. T R 1:25–2:40. Staff.

Issues in the development of social behavior are viewed from the perspective of theory and research. Likely topics include bases of social behavior in infancy and early childhood, the role of parents, siblings, and peers, the development of prosocial and aggressive behavior, the development and functioning of attitude and value systems, and the function and limits of experimental research in the study of social development.]

HD 266 Emotional Functions of the Brain

Fall. 3 credits. Prerequisite: a biology course. Letter grades only. M 10:10–12:35. R. Depue.

Much of our social behavior, and what we refer to as personality, is related to phylogenetically-old emotional systems, systems that help us to adapt to critical stimuli in the environment. These systems are structured and organized within the brain, but they are also capable of being modified by our everyday experiences. After an overview of the gross anatomy of the primate brain is presented, the focus of the course concerns networks of brain regions that are organized around the integration of processes related to emotion and motivation. First, general features of the brain in relation to emotional evaluation and expression processes are discussed, and then the brain organization is related to several specific types of emotional systems. Neurobiological modulation of emotional processes by neurotransmitters of wide distribution in the brain are detailed as well. The latter helps to lay the groundwork for understanding the nature of individual differences in much of our social and emotional behavior.

HD 281 Foundations of Clinical Practice (also PSYCH 281)

Fall. 3 credits. Enrollment limited to 60 students (30 HD/30 PSYCH). W 1:30–4:30. C. Maxwell Miller.

This course provides an introduction to the theoretical and practical aspects of some basic elements of counseling. Students will develop an understanding of the most current research on the elements of counseling and basic theoretical foundations underlying different approaches. Students will be expected to acquire and demonstrate elementary helping skills. Through role-play, observation of videos, and in-class demonstrations, students will learn such skills as attending and active listening; they will also develop a capacity to recognize internal conflicts and cognitive distortions as well as the similarities between intra-psychic and interpersonal processes. Other topics include issues of transference and countertransference, the multi-axial dimensions of the DSMIV, defensive strategies as they appear in the DSMIV, and ethical considerations and practices. While this course provides an introduction to the applied aspects of psychology, it does not prepare students to provide treatment of any sort.

HD 282 Community Outreach (also PSYCH 282)

Fall and spring. 2 credits. Letter grades only. Prerequisites: HD 115 or Psychology 101. Students may not concurrently register with HD 327 or HD 328 or Psych 327 or Psych 328. T 10:10–11:25. H. Segal.

This course provides students with information and perspectives needed to do volunteer fieldwork with human and social service programs in the community. To gain a practical understanding of what mental health professionals do in the workplace, students will examine problems that emerge in fieldwork settings, which raise ethical, methodological, theoretical, and practical issues in the observation or treatment of clients or patients. They will also be introduced more generally to the Field of Community Psychology, its history, theory, and applications. Although students are not required to volunteer at a local agency, the instructor will assist students in finding sites that may provide appropriate learning opportunities.

[HD 284 Introduction to Sexual Minorities (also WOMNS 285)

Fall. 3 credits. Prerequisite: one social science course. S-U grades optional. M 7:30–10:00 P.M. Not offered 2001–2002. R. Savin-Williams.

This course introduces students to theories, empirical scholarship, public policies, and current controversies with lesbian, gay, bisexual, transgender, sexually questioning, and other sexual minority populations. The major focus is on gay, lesbian, and bisexual development, lifestyles, and communities with additional emphasis on ethnic, racial, gender, and class issues. Videos supplement the readings and lectures.]

HD 300 Special Studies for Undergraduates

Fall or spring. Credit to be arranged. Permission required.

Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multicopy description of the study they want to undertake on a form available from the College Registrar's Office. The form, signed by both the instructor directing the study and the coordinator of undergraduate education, is filed at course registration or during the change-of-registration period.

HD 313 Problematic Behavior in Adolescence (also PSYCH 313)

Fall. 3 credits. Prerequisite: HD 115 or Psychology 101; HD 216 recommended. M W 2:55–4:10. J. Haugaard.

This course will explore several problematic behaviors of adolescence, including depression, drug abuse, eating disorders, and delinquency. Various psychological, sociological, and biological explanations for the behaviors will be presented. Appropriate research will be reviewed; treatment and prevention strategies will be explored. An optional discussion section will be available to students who would like an opportunity to discuss readings and lectures in greater depth.

HD 327 Field Practicum I (also PSYCH 327)

Fall. 3 credits. Enrollment limited to 30 students. Students must commit to taking HD 328 in the spring semester. Prerequisites: HD 370 or Psychology 325 and permission of instructor. Letter grades only. M W 8:40–9:55. H. Segal.

This course provides three components, which form an intensive undergraduate field practicum. Students spend three to six hours a week at local mental health agencies, schools, or nursing facilities working directly with children, adolescents, or adults; supervision is provided by host agency staff. Cornell faculty provide additional weekly educational supervision for each student. Seminar meetings cover issues of adult and developmental psychopathology, clinical technique, case studies, and current research issues. Students write two short papers, two final take-home exams, and present an account of their field experience in class.

HD 328 Field Practicum II (also PSYCH 328)

Spring. 3 credits. Enrollment is limited to 30 students. Prerequisites: HD 327 or Psychology 327 taken the previous term, Psychology 325 or HD 370 and permission of instructor. Letter grades only. M W 8:40–9:55. H. Segal.

This course continues the field practicum experience from HD 327. Students spend three to six hours a week at local mental health agencies, schools, or nursing facilities working directly with children, adolescents or adults; supervision is provided by host agency staff. Cornell faculty provide additional weekly educational supervision for each student. Seminar meetings cover issues of adult and family psychopathology, clinical technique, case studies, and current research issues. Students write two short papers, two final take-home exams, and present an account of their field experience in class.

HD 334 The Growth of the Mind

Spring. 4 credits. Open to undergraduate and graduate students. Graduate students should also enroll in HD 635, a supplemental graduate seminar. Prerequisites: a course in human experimental psychology, statistics, or HD 115 or equivalent; or permission of the instructor. S-U grades optional. T R 2:55–4:10. B. Lust.

In this course the fundamental issues of cognition are introduced. Students are asked to consider a number of questions. What is

the nature of human intelligence? How are knowledge and understanding acquired and represented in the human mind? What is the nature of mental representation? What are the cognitive characteristics of the mind at birth? What is the relation of the acquisition of knowledge and understanding to their final representation? What are the relations between language and thought? In the study of those issues, how can epistemology and experimental psychology be related through the experimental method? Basic debates within the study of cognition are introduced and discussed throughout. The course will analyze Piaget's comprehensive theory of cognitive development and experimental results. Current research in cognitive development will be contrasted.

HD 344 Infant Behavior and Development

Fall. 3 credits. Prerequisites: HD 115, a biology course, and a statistics course. Not open to freshmen. M W F 1:25–2:15. S. Robertson.

Behavior and development from conception through the first two years of life will be examined in traditional areas (e.g., perception, cognition, socioemotional theory, language, motor function). The fundamental interconnectedness of these aspects of development will be strongly emphasized, as will their relation to the biology of fetal and infant development. Topics with implications for general theories of development will be emphasized (e.g., the functional significance of early behavior, the nature of continuity and change, and the role of the environment in development). Conditions which put infants at risk for poor development (e.g., premature birth, exposure to environmental toxins, maternal depression) and topics with current social, ethical, or political implications (e.g., infant day care, fetal rights) will also be considered. An emphasis on research methodology in the study of early behavior and development will be maintained throughout the course.

HD 346 The Role and Meaning of Play

Fall. 2 credits. Limited to 30 juniors and seniors. Prerequisite: HD 115. M 7:30–9:25 P.M. J. Ross-Bernstein.

The aim of this course is to examine the play of children ages three through seven. Through seminar discussions, workshops, films, and individualized research the student will explore the meaning and validity of play in the lives of young children, the different ways that children play and the value of each, and the effect of the environment in enhancing and supporting play.

[HD 347 Human Growth and Development: Biological and Behavioral Interactions (also B&SOC 347 and NS 347)

Spring. 3 credits. Prerequisites: Biological Sciences 101 or 109 or equivalent, and HD 115 or Psychology 101. Limited to 150 students. M W F 1:25. Offered alternate years. Not offered 2001–2002. S. Robertson and J. Haas.

This course is concerned with the interrelationships of physical and psychological growth and development in humans during infancy. Intrinsic and extrinsic causes of variations in growth, including various forms of stimulation, are considered. In addition, the consequences of early growth and its variations for current and subsequent behavioral, psychological, and physical development are examined. The interaction between physical and behavioral or psychological factors is emphasized throughout the course.]

HD 348 Advanced Participation with Children

Spring. 4–8 credits. Limited to 20 students (limit depends on availability of placements and supervision). Prerequisites: HD 115 and HD 242; and permission of instructor. Recommended: HD 346. S-U grades optional. T 12:20–2:15. J. Ross-Bernstein.

An advanced, supervised field-based course, designed to help students deepen and consolidate their understanding of children. Students are expected to define their own goals and assess progress with supervising teachers and the instructor; to keep a journal; and to plan, carry out, and evaluate weekly activities for children within their placement. Conference groups and readings focus on the contexts of development and on ways to support children's personal and interpersonal learning. Each student is expected to do a presentation and paper on a self-selected topic within the scope of the class. Participation is in settings that serve typical and/or special needs children from three to eight years of age and provide education, care, or special-purpose interventions for them.

[HD 353 Risk and Opportunity Factors in Childhood and Adolescence

Spring. 3 credits. Enrollment limited to 100 students. Prerequisites: HD 115 and HD 250. S-U grades optional. T R 1:25–2:40. Not offered 2001–2002. J. Garbarino.

This course explores the meaning of risk and opportunity in the lives of children and youth. It begins with understanding risk accumulation and resilience as they relate to social policy, professional practice, and community development. The concept of "social toxicity" is a central theme of the course. Assignments include writing research-based editorials and participating in a simulated public policy debate.]

[HD 359 American Families in Historical Perspective (also WOMNS 357, HIST 359, AM ST 359)

Spring. 3 credits. Prerequisite: HD 250 or one 200-level social science or history course. S-U grades optional. Human ecology students must register for HD 359. Not offered 2001–2002. J. Brumberg.

This course provides an introduction to and overview of problems and issues in the historical literature on American families and the family life cycle. Reading and lectures demonstrate the pattern of American family experience in the past, focusing on class, ethnicity, sex, and region as important variables. Analysis of the private world of the family deals with changing cultural conceptions of sexuality, sex roles, generational relationships, stages of life, and life events. Students are required to do a major research paper on the history of their family, covering at least two generations, and demonstrating their ability to integrate life-course development theory, data drawn from the social sciences, and historical circumstances.]

HD 362 Human Bonding

Fall. 3 credits. Limited to 600 students. Recommended: introductory course in psychology or human development. S-U grades optional. T R 1:25–2:40. C. Hazan.

The science of interpersonal relationships. Examines the basic nature of human affectional bonds, including their functions and dynamics. Covers such topics as interpersonal attraction and mate selection, intimacy and commitment, love and sex, jealousy and loneliness, the neurobiology of affiliation and attachment, and the role of relationships in physical and psychological health.

HD 366 Psychobiology of Temperament and Personality

Spring. 3 credits. Letter grades only. Prerequisite: HD 266. M 7:30–10:00 P.M. R. Depue.

This course is for students who have an interest in the neurobiology of behavior, in general, and in temperament and personality, in particular. The course material is presented within an evolutionary biology perspective, where the development of neurobehavioral systems as a means of adapting to critical stimuli is explored as the basis of emotional traits in humans. The nature of temperament, social affiliation, and personality is explored from psychometric, social, genetic, and biological points of view. There is a focus on the general role played by the biogenic amines (dopamine, norepinephrine, and serotonin) and opiates in determining individual differences in temperament and personality. Implications for several forms of personality disorders and psychopathology are also discussed. Finally, the manner in which environmental influences across the life span may be coded in the brain and influence the development of personality is explored.

HD 368 Children's Development in Different Cultures

Spring. 3 credits. Letter grades only. Prerequisites: HD 115 or Psych 101 and one college-level statistics course. M W 2:55–4:10. K. Greene.

This course will examine the influence of ecological, cultural, and ethnic factors on the social and cognitive development of children in different cultures. Particular attention will be given to research methodologies that guide us in making comparisons about parent-child development across cultures. Topics will include family origin and universality, parental roles, child-family interaction, patterns of kinship, and economic and health issues.

HD 370 Adult Psychopathology (also PSYCH 325)

Spring. 3 credits. Limited to sophomores, juniors, and seniors. Prerequisites: any one course in psychology or human development. M W 2:55–4:10. S. Bem.

A research-based introduction to the biological, psychological, and social (including cultural and historical) aspects of adult psychopathology. The major mental illnesses will be covered, including but not limited to, schizophrenia, mood disorders, anxiety disorders, and personality disorders. Childhood disorders will not be covered.

HD 400–401–402–403 Special Studies for Undergraduates

Fall or spring. Credits to be arranged (1–4). Permission required. S-U grades optional.

For advanced independent study by an individual student or for study on an experimental basis with a group of students in a field of HD not otherwise provided through course work in the department or elsewhere at the university. Students prepare a multicopy description of the study they want to

undertake, on a form available from the department office in NG14. This form must be signed by the instructor directing the study and the student's faculty adviser and submitted to NG14 MVR, the Office of Undergraduate Education. After the form is approved, the student takes the form to the College Registrar's Office, 145 MVR, along with an add/drop slip. To ensure review before the close of the periods, early submission of the special studies form to the Office of Undergraduate Education is necessary. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study.

400: Directed Readings. Permission required. For study that predominantly involves library research and independent study.

401: Empirical Research. Permission required. For study that predominantly involves data collection and analysis, or laboratory or studio projects.

402: Supervised Fieldwork. Permission required. For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

403: Teaching Apprenticeship. Enrollment limited to juniors and seniors with a minimum 3.0 GPA. Prerequisites: either HD 115, 250, and two intermediate level HD courses, or four courses in psychology or sociology. Students must have taken the course or equivalent and received a grade of B+ or higher. Permission required. For study that includes assisting faculty with instruction.

[HD 417 Female Adolescence in Historical Perspective (also WOMNS 438, HIST 458, AM ST 417)

Spring. 3 credits. Limited to 25 students. Prerequisites: HD 216 and at least one 300-level history or women's studies or American studies course. Permission of instructor required. Juniors and seniors only. T 1:55–4:25. Not offered 2001–2002. J. Brumberg.

A reading, writing, and discussion course that will attempt to answer a basic historical question that has consequences for both contemporary developmental theory and social policy: how has female adolescence in the United States changed in the past 200 years? The focus will be on the ways in which gender, class, ethnicity, and popular culture shape adolescent experience. Although the required readings are primarily historical in nature, students are encouraged to think about the interaction of biology, psychology, and culture. Students are required to do a primary source research paper.]

HD 418 Psychology of Aging

Fall. 3 credits. Enrollment limited to 25 students. Prerequisites: HD 115, 250, and 218 or permission of instructor. Letter grades only. Offered alternate years. T R 2:55–4:10. S. Cornelius.

This seminar addresses major issues and controversies in the field of aging. It is designed for upper-level students who wish to pursue an in-depth analysis of concepts such as "successful" aging and wisdom, as well as controversies surrounding issues of generational equity and the right to die. Although these issues are addressed primarily from a psychological viewpoint, interdisciplinary perspectives are considered and incorporated in both readings and discussions. The seminar is designed for advanced undergraduates who have completed an introductory course in adulthood and aging and wish to pursue such issues in more depth. Class time will be primarily devoted to discussion of assigned readings.

[HD 419 Midlife Development

Fall. 3 credits. Enrollment limited to 25 students. Letter grades only. Prerequisites: HD 115, 250 and 218 or permission of instructor. T R 2:55–4:10. Offered alternate years. Not offered 2001–2002. S. Cornelius.

This course examines the burgeoning research literature on adult development during midlife. The focus of the course will be on research and theory examining psychological changes during middle adulthood such as relativistic and dialectical thinking, personality, identity, and sense of control. It also considders the social and physical changes that occur at this time of life especially regarding issues such as empty nest anxieties, divorce, career transitions, menopause, and cardiovascular disease. The course will be conducted in a seminar format for upper-level undergraduates. Oral presentations, class participation, and an integrative paper will be required.]

[HD 436 Language Development (also COGST 436, PSYCH 436 and LING 436)

Spring. 4 credits. Open to undergraduate and graduate students. Graduate students should also enroll in HD/LING 700, a supplemental graduate seminar. Prerequisite: at least one course in developmental psychology, cognitive psychology, cognitive development, neurobiology, biology, or linguistics. S-U grades optional. A supplemental lab course is available (HD 437). T R 2:55–4:10. Not offered 2001–2002. B. Lust.

This course surveys basic issues, methods, and research in the study of first-language acquisition. Major theoretical positions in the field are considered in the light of experimental studies in first-language acquisition of phonology, syntax, and semantics from infancy on. The fundamental issues of relationships between language and thought are discussed, as are the fundamental linguistic issues of "Universal Grammar" and the biological foundations for language acquisition. The acquisition of communication systems in nonhuman species such as chimpanzees is addressed, but major emphasis is on the child.]

[HD 437 Lab Course: Language Development (also COGST 450, PSYCH 437 and LING 450)

Spring. 2 credits. Prerequisite: HD/COGST/PSYCH/LING 436 or equivalent. R 1:25-2:40. Not offered 2001–2002. B. Lust.

This laboratory course is an optional supplement to the survey course, Language Development (HD/COGST/PSYCH/LING 436). The lab course will provide students with a hands on introduction to scientific research, including design and methods in the area of first language acquisition.]

HD 438 Thinking and Reasoning

Fall. 3 credits. Prerequisite: HD 115 or Psychology 101. T R 1:25–2:40. B. Koslowski.

The course will examine problem solving and transfer, pre-causal thinking, logical thinking, practical syllogisms, causal reasoning, scientific reasoning, theories of evidence, expert vs. novice differences, and nonrational reasoning. Two general issues will run through the course: the extent to which children and adults approximate the sorts of reasoning that are described by various types of models, and the extent to which various models accurately describe the kind of thinking that is required by the types of problems and issues that arise and must be dealt with in the real world.

HD 439 Cognitive Development: Infancy through Adolescence

Spring. 3 credits. Prerequisites: HD 115 or Psychology 101. Letter grades only. T R 1:25–2:40. B. Koslowski.

The course will be an overview of current and classic issues and research in cognitive development. Central topics of both "hard cognition" (e.g., information processing and neuropsychological functioning) and "soft cognition" (e.g., problem solving, concepts, and categories) will be covered. Selected topics will be linked to methodological issues and to important social issues such as cross-cultural cognitive development and putative racial and social class differences.

HD 440 Internship in Educational Settings for Children

Fall or spring. 8–12 credits. Prerequisites: HD 115, 242, or 243 and 348. Recommended: HD 346. Permission of instructor required. S-U grades optional. J. Ross-Bernstein.

Opportunity to integrate theory with practice at an advanced level and to further develop understanding of children ages 2 to 10 and their families. Interns will function as participants in varied settings and participate in curriculum planning, evaluation, staff meetings, home visits, parent conferences, and parent meetings. Supervision by head teacher and instructor. Students are expected to define their own goals and to assess their progress, to do assigned and self-directed readings, and to keep a critical incident journal.

[HD 451 Nontraditional Families and Troubled Families

Spring. 3 credits. Limited to 30 students. Prerequisites: HD 115 and 250. Letter grades only. T R 8:40–9:55. Offered alternate years. Not offered 2001–2002. J. Haugaard.

This is an advanced course designed to explore the functioning of families. The first part of the course examines family system theory and how it relates to our understanding of all families. Four types of families are then examined: two nontraditional families (e.g., adoptive families) and two troubled families (e.g., families with a chronically ill child).]

HD 456 Families and Social Policy

Spring. 3 credits. Prerequisite: one course in the area of the family or in sociology. S-U grades optional. M 7:30–10:00 P.M. T. Mitrano.

An examination of the intended and unintended family consequences of governmental policies, using case studies in areas such as social welfare, day care, and employment. The policy implications of changes in the structure and composition of families are also considered.

HD 457 Health and Social Behavior (also SOC 457)
Fall. 3 credits. Prerequisites: a course in statistics and one of the following: HD 250, Sociology 101, Sociology 251, or Rural Sociology 101. Letter grades only. T R 10:10–11:25. Offered alternate years. E. Wethington.
This course critically examines theories and empirical research on the relationships among social group membership, social status, and physical and mental health. The lectures focus on social stress, social support, and socioeconomic status, all of which are associated with variations in physical health, mental health, and health maintenance behaviors. Students are expected to read widely from current literature in medical sociology, health psychology, public health, and epidemiology.

HD 458 Parent-Child Development in African-American Families
Fall. 3 credits. Letter grades only. Enrollment limited to 25 seniors and juniors. Prerequisites: HD 115, HD 250, and a college level statistics course. T R 10:10–11:25. K. Greene.
This course will examine parent-child relationships in African-American families. Topics include historical influences on contemporary parenting behaviors, the impact of societal forces on African American families' socialization practices, and the influence of parental child rearing beliefs, strategies, and practices on African American children's development. Particular attention will be given to the relevance of mainstream theoretical formulations of African American's parental and familial functioning.

[HD 459 Disease in American Culture and Society (also AM ST 430)
Fall. 4 credits. Limited to 15 students. Prerequisites: HD 241, or HD 258, or HD 359, or HD 417. Permission of instructor required. Times TBA. Not offered 2001–2002. J. Brumberg.
How a society defines, explains, treats, and tries to prevent disease reveals a great deal about its basic ideals, values, and institutions. Diseases are not simple biological "facts," but the product of a complex amalgam of biological and social forces. This course uses the history of specific diseases to examine: (1) the ways in which the social and cultural environment shape the experience of illness; (2) the ideas that Americans have held about why some people get sick and others do not; (3) how those ideas reflect larger cultural as well as scientific trends; (4) the ways in which power relationships are involved in defining and responding to the threat of disease; (5) and the impact that disease has had on American society. A short response paper must be written for each session. An additional historiographical essay or research paper will be prearranged with the instructor.]

HD 464 Sexual Minorities and Human Development (also WOMNS 467)
Spring. 3 credits. Limited to 15 students. Priority given to seniors and juniors. T R 10:10–11:25. R. Savin-Williams.
This course covers topics selected by students regarding theoretical, research, and applied issues on sexual minorities. In the second half of the course, students lead a class that focuses on a research topic of their choosing. The success of the course depends on students feeling personally engaged and committed to the course content. Students are expected to participate fully in the class discussions. Because of the multidisciplinary nature of the course, students from a variety of backgrounds in academic disciplines, gender, sexual orientation, ethnicity, race, class, and religious affiliation will be in the course.

[HD 468 Stress in Childhood and Adolescence
Fall. 3 credits. Recommended: HD 115, HD 250 and a statistics course. Letter grades only. TBA. Not offered 2001–2002. J. Eckenrode.
This is an advanced seminar that will review research related to the nature and consequences of stressful experiences in childhood and adolescence, particularly those arising in the family. Topics covered represent common stressors in the lives of children (e.g. divorce of parents), which have potentially damaging consequences for development (e.g. child abuse). Topics in which faculty at Cornell have conducted significant research (e.g. children's memory for stressful events) are also covered. In addition to considering the negative affect of stress on development, we will also consider issues of individual differences in stress reactivity, including the concepts of coping and resilience. These topics lead naturally into discussions of practice and policy.]

[HD 471 Child Development and Psychopathology
Fall. 3 credits. Limited to 60 advanced-level students. Prerequisites: HD 115 or Psychology 101. Strongly recommended: a basic course in psychopathology. Letter grades only. M W 8:40–9:55. Not offered 2001–2002. J. Haugaard.
This class will explore the development and process of mental, emotional, and behavioral disorders in children such as mental retardation, autism, and attention deficit disorder. Topics will include: (1) the classification of mental disorders; (2) biological, psychological, and sociological theories regarding the development and maintenance of mental disorders; (3) prevalence and etiology of childhood mental disorders, and (4) therapeutic and preventive interventions. If there is sufficient enrollment, an optional discussion section will be available to those students who would like an opportunity to discuss readings and lecture material in greater depth.]

HD 483 Early Child Care and Education in Global Perspective
Fall. 3 credits. Enrollment limited to 25 juniors and seniors. Prerequisites: HD 115 and HD 250. S-U grades optional. T R 2:55–4:10. M. Cochran.
In this course we examine American child care policies and programs, broadly defined, in the context of policies and programs in Africa, Asia, Europe, and Latin America. Comparison and analysis are guided by several complementary conceptual frameworks. Particular attention is given to relativism and universalism as applied to developmental and educational principles and concepts. Students specialize in the child care policies and programs of another country, work in teams to analyze a contemporary policy issue, and apply course content to an issue of their choice in a final paper.

HD 498 Senior Honors Seminar
Fall and spring. 1 credit. Required for, and limited to, seniors in the HD honors program. S-U grades only. TBA. S. Cornelius.
This seminar is devoted to discussion and presentation of honors theses being completed by the senior students.

HD 499 Senior Honors Thesis
Fall or spring. Credit to be arranged. Prerequisite: permission of thesis adviser and coordinator of honors program. S-U grades optional. Department faculty.

HD 106, 206, 306, 406 Topics in Human Development
2–4 credits. S-U grades optional.
These topics vary each time the course is offered and are taught by advanced graduate students in the field of human development. Descriptions are available at the time of course registration. These courses do not fulfill any requirements for the major; they must be taken as electives.

Topics Courses

Fall or spring. 2–4 credits. Prerequisites and enrollment limits vary with topic being considered in any particular term. Permission of instructor may be required.
This series of courses provides an opportunity for undergraduates to explore an issue, a theme, or research in the areas of departmental concentration. Topics vary each time the course is offered. Descriptions are available at the time of course registration. Although the courses are usually taught as seminars, a subject may occasionally lend itself to lecture, practicum, or other format.

HD 215, 315, 415 Topics in Adolescent and Adult Development

HD 235, 335, 435 Topics in Cognitive Development

HD 245, 345, 445 Topics in Early-Childhood Development and Education

HD 255, 355, 455 Topics in Family Studies and the Life Course

HD 265, 365, 465 Topics in Social and Personality Development

HD 275, 375, 475 Topics in Developmental Psychopathology

HD 285, 385, 485 Topics in the Ecology of Human Development

The Graduate Program

HD graduate courses are only open to undergraduates with instructor's permission.

General Courses

[HD 610 Processes in Human Development: Theoretical Models and Research Designs
Spring. 3 credits. Open to graduate students and juniors and seniors in HD and related fields with instructor's permission. Prerequisite: a minimum of one course in statistics. Letter grades only. W 2:00–4:25. Not offered 2001–2002. U. Bronfenbrenner.
The purpose of the seminar is to acquaint students with selected scientific paradigms being employed at the frontiers of developmental science for investigating the conditions and processes that shape human development over the life course. Particular attention will be given to research models that draw on disciplines (such as evolutionary biology, human genetics, developmental psychology,

sociology, anthropology, history, economics). The principal seminar activities consist of faculty and student development of research questions, critical analysis of these questions in the light of diverse theoretical perspectives, and their corresponding research designs. In this process, the human being is treated as an integrated organism.]

[HD 617 Adolescence
Spring. 3 credits. Not offered 2001–2002. Staff.
Critical examination of seminal theoretical and empirical writings on adolescent development. Empirical research on specific questions chosen by students is considered in the light of these approaches.]

[HD 631 Cognitive Development
Fall. 3 credits. Letter grades only. Not offered 2001–2002. Staff.
Faculty members involved in the course will present their area of specialization in cognitive development. These areas will include perception, attention, memory, language, thinking and reasoning, learning, creativity, and intelligence.]

[HD 640 Infancy
Fall. 3 credits. TBA. Not offered 2001–2002. S. Robertson.
Development in infancy will be examined through a critical review of key research and theory in selected aspects of neurobehavior, perception, cognition, language, emotion, and social relationships. Theoretical issues to be considered include the role of experiences in early development, sensitive periods, continuity and discontinuity in development, and the functional significance of early behavior. Some of the conditions that put infants at risk for poor development will also be considered, such as premature birth, perinatal medical complications, and exposure to environmental toxins. The course will combine perspectives from developmental psychology and psychobiology.]

[HD 650 Contemporary Family Theory and Research
Fall. 3 credits. Not offered 2001–2002. E. Wethington.
Sociological and social psychological theories and research on the family are examined with reference to the relationship between the family and society. Topics change from year to year, but focus on the processes of socialization and social control, the reproduction of gender and social class across generations, changes in family "values" across time, the rise of divorce and single motherhood, family diversity, and the genesis of deviance and psychological disorder.]

[HD 660 Social Development
Spring. 3 credits. S-U grades optional. Not offered 2001–2002. Staff.
This course is designed to provide both broad and in-depth training in the areas of social and emotional development during infancy and childhood. It will cover most of the major topic areas and theoretical orientations. Consideration will be given to basic influences on socioemotional development—biological, social, and cultural. Coverage will include normative development as well as the origins and nature of individual differences. We will explore such fundamental issues and questions as: What are emotions? What role do they play in the development and organization of personality? What are the effects of early social relationships on emotional regulation? When and how does the self-system emerge? Emphasis will be on the processes—both internal and external—that help determine the course and outcome of development.]

[HD 670 Experimental Psychopathology
Spring. 3 credits. Prerequisite: an undergraduate course in abnormal psychology or psychopathology; a course in multivariate statistics; and substantive course work in neurobiology or related biological science. TBA. Not offered 2001–2002. Staff.
Overview of current theories and empirical research on functional and organically based psychological disorders. Topic areas to be covered include autism, schizophrenia, anxiety disorders, affective disorders, and personality disorders. Focus is on the developmental and etiology of psychopathology.]

Topical Seminars

Seminars offered irregularly, with changing topics and instructors. Content, hours, credit, and instructors to be announced. Seminars offer concentrated study of specific theoretical and research issues.

HD 618 Seminar in Adolescence and Adult Development
Topics include peer relations, parent-teen relationships, self-esteem, youth and history, work, and moral development.

HD 633 Seminar on Language Development
Topics include acquisition of meaning in infancy, precursors of language in early infancy, and atypical language development.

HD 635 Seminar in Cognitive Development
Topics include early attention, perception, memory, and communication. Assessment and intervention in relation to these processes will be considered when possible.

HD 645 Seminar on Infancy
Focuses on selected topics in the developmental psychology and psychobiology of infancy (including fetal development). Special topics vary and depend in part on student interests.

HD 646 Seminar in Early-Childhood Development and Education
Topics include analysis of models and settings, design of assessment techniques, program evaluation, and early childhood in a cross-cultural context.

HD 655 Seminar in Family Studies and the Life Course
Topics include the sociology of marital status, the single-parent family, work-family linkages, women and work, and families and social change.

HD 665 Seminar in Personality and Social Development
Focuses on selected issues related to personality and social development. The issues selected vary each year according to current importance in the field and student interests.

HD 675 Seminar in Developmental Psychopathology
Topics include learning disabilities, therapeutic interventions in atypical development, child abuse and maltreatment, family factors in the etiology of functional disorders, and cognitive characteristics of atypical groups.

HD 685 Seminar in Research Methods
This course focuses on quantitative and qualitative research methods frequently used in developmental psychology or life course studies, such as surveys, questionnaires, observations, and interviews.

HD 690 Seminar on Ecology of Human Development
Topics include the institutional setting as a determinant of behavior, the poor family, and the identification and measurement of ecological variables.

Individualized Special Instruction

HD 700–806 Special Studies for Graduate Students
Fall or spring. Credits and hours to be arranged. Credits 1–15 (3 hours work per week per credit). S-U grades at discretion of instructor.
Independent advanced work by graduate students recommended by their Special Committee chair with permission of the instructor.

HD 700 Directed Readings
For study that predominantly involves library research and independent study.

HD 701 Empirical Research
For study that predominantly involves collection and analysis of research data.

HD 702 Practicum
For study that predominantly involves field experience in community settings.

HD 703 Teaching Assistantship
For students assisting faculty with instruction. Does not apply to work for which students receive financial compensation.

HD 704 Research Assistantship
For students assisting faculty with research. Does not apply to work for which students receive financial compensation.

HD 705 Extension Assistantship
For students assisting faculty with extension activities. Does not apply to work for which students receive financial compensation.

HD 706 Supervised Teaching
4 credits.
For advanced students who assume major responsibility for teaching a course. Supervision by a faculty member is required.

HD 806 Teaching Practicum
4 credits. For advanced graduate students to independently develop and teach an undergraduate topics course under the supervision of a faculty member.

HD 899 Master's Thesis and Research
Fall or spring. Credit to be arranged. Credits 1–15 (3 hours work per week per credit). S-U grades only. Prerequisite: permission of thesis adviser.

HD 999 Doctoral Thesis and Research
Fall or spring. Credit to be arranged. Credits 1–15 (3 hours work per week per credit). S-U grades only. Prerequisite: permission of thesis adviser.

POLICY ANALYSIS AND MANAGEMENT

R. Burkhauser, chair; W. Trochim, Policy Analysis and Management, director of graduate studies; A. Mathios, director of undergraduate studies; D. Kenkel, interim director of Sloan Program; K. Waldron, associate director of Sloan Program; J. Allen, R. J. Avery, R. Battistella, B. J. Bristow, R. Burkhauser, J. S. Butler, J. Cawley, P. Chi, R. Dunifon, J. Gerner, R. Heck, K. Joyner, A. Kabcenell, D. Kenkel, J. Kuder, A. Mathios, L. O'Neill, A. Parrot, E. Peters, P. Pollak, E. Rodriguez, W. Rosen, N. Roufaiel, J. Schultz, K. Simon, S. Tennyson, J. Tiffany, D. Tobias, W. Trochim; R. Babcock, Emeritus; D. Barr, Emeritus; H. Biesdorf, Emeritus; W. K. Bryant, Emeritus; G. Bymers, Emerita; F. M. Firebaugh, Emerita; J. Ford, Emeritus; A. Hahn, Emeritus; E. S. Maynes, Emeritus; C. McClintock, Emeritus; J. Mueller, Emerita; L. Noble, Emerita; J. Robinson, Emerita; C. Shapiro, Emerita; L. Street, Emeritus; K. Walker, Emerita; B. L. Yerka, Emerita; J. Ziegler, Emeritus

NOTE: Class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

PAM 200 Intermediate Microeconomics
Fall or spring. 4 credits. Prerequisite: Econ 101 or equivalent. Fall: preference to sophomores and juniors. Spring: preference to juniors and seniors. Staff.
Topics include theory of demand and consumer behavior including classical and indifference curve analyses; theories of production and cost; models for the following markets—competitive, monopoly, monopolistic competition, oligopoly, and inputs; general equilibrium; welfare economics; public goods; and risk. A section is mandatory.

PAM 204 Applied Public Finance
Fall or spring. 3 credits. Prerequisites: PAM 200. S-U grades optional. D. Kenkel, K. Simon.
The public sector now spends nearly 2 out of every 5 dollars generated as income in the U.S. economy. A thorough knowledge and understanding of this important sector is an essential part of training in policy analysis and management. This course will provide an overview of the public sector of the U.S. economy, the major categories of public expenditures, and the main methods used to finance these expenditures. The principles of tax analysis and cost-benefit analysis will be presented with a focus on the role of public policy in improving economic efficiency, promoting the goals of equity and social justice, and improving equity by altering the distribution of wealth and income.

PAM 205 Research Methods
Fall or spring. 3 credits. Sections TBA. Staff.
Students will learn the logic and methods of social science research, as well as how to create researchable questions out of their issues of interest. Readings, written assignments, and in-class exercises will focus on stating hypotheses, designing studies and samples to test hypotheses, measuring variables, and simple statistical analysis. PAM majors should take this course no later than their junior year.

PAM 210 Introduction to Statistics
Fall and spring. 4 credits. K. Joyner.
This course introduces students to descriptive and inferential statistics. Topics include hypothesis testing, analysis of variance, and multiple regression. To illustrate these topics, this course examines applications of these methods in studies of child and family policy.

PAM 220 Introduction to Management: Principles and Differences Among Sectors
Fall or spring. 3 credits. D. Tobias, R. Heck.
This course is a basic introduction to major management and related concepts of planning, organizing, controlling, leadership, and special topics within five major management contexts including individual/personal, groups/families, firms, not-for-profit organizations, and governments/communities.

[PAM 223 Consumer Markets I
Fall. 4 credits. Not offered 2001–2002. R. J. Avery.
A study of the structure and functioning of consumer retail markets with emphasis on the marketing activities of firms, changes in demand for goods and services driven by the dynamics of consumer demographics, and government control and intervention in market exchanges. The course teaches market analysis skills and involves group project work consulting with local businesses. Course format is highly audio-visual and incorporates guest lectures from prominent consumer product firms.]

PAM 230 Introduction to Policy Analysis
Fall or spring. 3 credits. R. Avery, J. Gerner.
Policy analysis is an interdisciplinary field that uses theories, concepts, and methods from disciplines such as economics, sociology, and political science to address substantive issues in the public policy arena. Students will be introduced to the functions of and interactions between the major institutions (public and private) at the national, state, and local level involved in the policy making process. The course will focus on public policy analysis in the consumer, health, and family/social welfare areas and will also include an introduction to the technical skills required to undertake policy analysis.

PAM 240 Critical Perspectives
Fall. 3 credits. Staff.
This course presents an overview of different perspectives on U.S. social policies and programs with an emphasis on health, welfare, family, and consumer issues. Historical, political, social science and personal perspectives are contrasted. Students are gain knowledge about the social policy and program topics presented in the course, critically analyze them using conceptual frameworks presented in class, and evaluate policy debates by applying these insights.

PAM 270 Housing and Society
Spring. 3 credits. S-U grades optional. P. Chi.
A survey of contemporary American housing issues as they relate to the individual, the family, and the community. The course focuses on the current problems of the individual housing consumer, the resulting implications for housing the American population, and governmental actions to alleviate housing problems.

PAM 300 Special Studies for Undergraduates
Fall or spring. Credit to be arranged.
Special arrangement for course work to establish equivalency for training in a previous major or institution. Students prepare a multicopy description of the study they want to undertake on a form available from the College Registrar's Office. This form, signed by both the instructor directing the study and the head of the department, should be filed at course registration during the change-of-registration period.

PAM 303 Ecology and Epidemiology of Health
Spring. 3 credits. S-U grades optional. Limited to 50 students. E. Rodriguez.
Ecological and epidemiological approaches to the problems which restrict human health within the physical, social, and mental environment. The course introduces epidemiological methods and surveys the epidemiology of specific diseases such as AIDS, hepatitis, Legionnaires' disease, plague, cancer, herpes, and chlamydia. Application of epidemiology to health care will be discussed.

PAM 305 Introduction to Multivariate Analysis
Fall or spring. 4 credits. Prerequisites: ARME 210 or ILRST 210 or equivalent. J. S. Butler, J. Schultz.
The course introduces basic econometric principles and the use of statistical procedures in empirical studies of economic models. Assumptions, properties, and problems encountered in the use of multiple regression procedures are discussed. Students are required to specify, estimate, and report the results of an empirical model. Factor analysis and analysis of variance will be covered as well. Section meets once a week.

[PAM 310 Evaluation of Public Policies
Fall. 3 credits. Prerequisites: PAM 200, 330, or permission of instructor. Not offered 2001–2002. Staff.
This is an advanced course in economic policy analysis that builds on the material covered in PAM 330, Intermediate Policy Analysis. The course will use a series of policy examples to demonstrate the economic approach. Special topics in cost-benefit analysis and policy evaluation techniques will be developed when necessary for the example under study. Examples of topics that may be addressed include excise taxation, economic evaluations of health care innovations, environmental policies, traffic regulations, consumer policies, and welfare reform.]

PAM 320 Introduction to Policy Management
Spring. 3 credits. Prerequisite: PAM 205, 220, and 230. W. Trochim.
An intermediate undergraduate course in policy management that will be focused around a single broad policy area that has numerous specific policies and programmatic implementations associated with it and that touches upon the three major substantive areas in PAM: consumer, health, and family and social welfare. Through lectures, intensive readings, case study, in-class discussion, secondary data analysis, and small-group projects, students will develop a deep understanding of what policy management means, and how it draws from a wide variety of disciplines (politics and government, history, sociology, economics, law, manage-

ment) and utilizes a wide range of methods, both quantitative and qualitative.

PAM 323 Consumer Markets II
Spring. 4 credits. R. J. Avery.
This course focuses on the cognitive, behavioral, and environmental forces that drive consumer demand. The first half of the course draws on theories and concepts from psychology and focuses on the cognitive processes whereby consumers interpret market-provided information and other stimuli in the purchase environment. The second half of the course draws on theories and concepts from retail anthropology to explain the behavior of consumers in the in-store environment. Particular emphasis is placed on communication institutions (advertising, television, print media), their impact on consumer decision making, and their control through government regulation. Course format is highly audio-visual and incorporates guest lectures from prominent consumer product firms, advertising agencies, and government regulators.

PAM 326 Personal Financial Management
Spring. 3 credits. Preference given to human ecology students; limit 50; not open to freshmen. S-U grades optional. R. Heck.
The study of personal financial management at various income levels and during different stages of the family life span. Course topics include financial management frameworks and decision-making processes, basic economic and financial principles, returns to human resources, income and wealth analysis, the role of consumer and mortgage credit, financial insolvency and counseling, expenditure and purchase analyses, the use of budgets and record keeping in achieving family economic goals, economic risks and available protection, retirement and estate planning, and alternative forms of savings and investments.

PAM 330 Intermediate Policy Analysis
Spring. 3 credits. Prerequisite: PAM 200. Staff.
Introduction to the tools and techniques of policy analysis. Topics covered include microeconomic concepts such as: consumer and producer surplus; deadweight loss; rationale for public policy; benefit-cost analysis; impact assessments; experimental, quasi-experimental, and nonexperimental designs; and the social ecology of policy analysis.

PAM 340 The Economics of Consumer Policy
Spring. 4 credits. Prerequisites: PAM 200 or permission of instructor. S. Tennyson.
This course is designed to familiarize students with the basic approaches to consumer policy and the economic analysis of consumer policy issues. The course is structured around the major forms of government intervention in consumer markets, and examines a wide variety of economic and social regulations from the economic perspective. Students are required to write a term paper analyzing a consumer policy issue of their choosing.

PAM 341 Economics of Consumer Law and Protection
Fall. 3 credits. Prerequisite: Econ 101 or equivalent. S-U grades optional. A. Mathios.
Economic analysis of the roles played both by the courts and by federal and state regulatory legislation in altering consumer markets, consumer behavior, and consumer welfare. Topics include economic analyses of contract law, product liability, accident law and antitrust law, and the activities of such agencies as the Federal Trade Commission, the Food and Drug Administration, and the Consumer Product Safety Commission.

PAM 346 Economics of Social Security (also ECON 447)
Spring. 3 credits. Prerequisite: PAM 200. S-U grades optional. R. Burkhauser.
This course provides students with an economic perspective on social security policies. The readings illustrate the use of economic analysis to predict the behavioral effects and income distributional consequences of policy. The course primarily focuses on the Old-Age, Survivors, and Disability Insurance Program. But other programs such as, the Supplemental Security Income, and Food Stamps will be discussed.

[PAM 350 Contemporary Issues in Women's Health
Fall. 3–4 credits. Not offered 2001–2002. A. Parrot.
This course deals with the history of women in medicine and the historical and cultural treatment of women's health problems. Health care research and the exclusion of women from research trials and protocols will also be addressed. Reproductive issues, alternative approaches to treatment, medical problems, ethical issues, cancers, factors that contribute to post-traumatic stress disorders, health promotion behaviors, political issues, and routine medical recommendations will also be discussed in depth. Students may take the course for a fourth credit, which will require attending a discussion section every other week and observing seven facilities (i.e., birthing center, mammogram, and ultrasound center, wellness center, hospital labor and delivery unit, LaMaze class, women's self defense class, etc.) that provide a variety of women's health care.]

PAM 371 Demography and Family Policy
Fall. 3 credits. K. Joyner.
This course examines from a demographic perspective family policies that concern children and adults. Toward this end, this course considers the relationships between family policies and demographic behavior. It also addresses the effects of family policies and demographic behavior on the well-being of children. Although this course focuses on the United States, it considers U.S. trends against the backdrop of changes in other industrialized countries.

[PAM 376 Housing, Neighborhood and Community
Spring. 3 credits. Prerequisite: PAM 270 or permission of instructor. S-U grades optional. Not offered 2001–2002. P. Chi.
The course examines the interrelationships of housing conditions, neighborhood transitions, and community development. Both theoretical and empirical perspectives on residential patterns, neighborhood change, and community power will be examined. Special attention is given to government policies that deal with fair housing, residential segregation, neighborhood revitalization, and community development.]

[PAM 380 Human Sexuality
Spring. 3 credits. Limited to 500 students. Prerequisite: an introductory course in human development and family studies, psychology, or sociology (or equivalent social science course). Recommended: one course in biology. Not offered 2001–2002. A. Parrot.
The aim of this course is to provide students with an understanding of the interactions and interrelationships of human behavior that influence sexual development and behavior. The course will focus on the evolution of sexual norms, cross-cultural customs, legislation within changing sociopolitical systems, and delivery of services related to sexual issues, needs, and/or problems. Future trends in sexuality will be addressed.]

[PAM 381 Healthcare Services and the Consumer
Fall. 3 credits. Prerequisite: an introductory course in human services or health or biology. S-U grades optional. Offered alternate years. Not offered 2001–2002. A. Parrot.
This course is an introduction to healthcare services and will present developments in the health field that affect the availability and kinds of health services. Emphasis is placed on the interrelationships of practitioners, institutions, and agencies. The part each can play in prevention, diagnosis, and treatment of disease and disability is also explored. Topics will include historical and current trends, quality health care, consumer issues, cultural concerns, ethical issues, politics and policies, and the contemporary problems of health care.]

PAM 383 Social Welfare as a Social Institution
Fall. 3 credits. J. Allen.
A philosophical and historical introduction to social welfare services. The course reviews the historical, social, and political contexts within which social welfare programs and the profession of social work have evolved. It discusses the political and ideological processes through which public policy is formed and the way policies are translated into social welfare programs. Basic issues in welfare are discussed through present program designs, public concerns, and the interrelationships and support of services in the community.

PAM 392 New York State Government Affairs
Spring semester only. 12 credits, letter grade and instructor permission only. Preference is given to juniors and seniors. PAM 220 or a course in government strongly recommended. Staff.
Students participate in the New York State Assembly Intern Program that includes a seminar and other course work on legislative processes, political party dynamics, and policy analysis and management. Students also participate in a thirty-hour-a-week New York State Assembly internship requiring research on legislation, support for legislator initiatives and pubic hearings, and work on constituent and interest group issues.

PAM 400–401–402 Special Studies for Undergraduates
Fall and spring. Credits to be arranged. S-U grades optional. Staff.
For advanced independent study by an individual student or for study on an experimental basis with a group of students

not otherwise provided through course work in the department or elsewhere at the university. Students prepare a multicopy description of the study they want to undertake on a form available from the department field office. This form must be signed by the instructor directing the study and the department chair and filed at course registration or within the change-of-registration period after registration with an add/drop slip in 145 MVR, College Registrar's Office. To ensure review before the close of the course registration or change-of-registration period, early submission of the special studies form to the department chair is necessary. Students, in consultation with their faculty supervisor, should register for one of the following subdivisions of independent study.

PAM 400: Directed Readings. For study that predominantly involves library research and independent reading.

PAM 401: Empirical Research. For study that predominantly involves data collection and analysis.

PAM 402: Supervised Fieldwork. For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

PAM 403 Teaching Apprenticeship
Prerequisite: students must have taken the course (or equivalent) in which they will be assisting and have demonstrated a high level of performance. For study that includes assisting faculty with instruction.

PAM 420 Management Information Systems for the Public Sector.
Spring. 3 credits. L. O'Neill.
This course focuses on managing information systems in the public and nonprofit sector. Its purpose is to present an overview of the management of technology and to develop the computer literacy that is required of today's managers. It will consist of three modules: technology, planning and management, and public/nonprofit applications such as those related to family and social welfare, health care, and consumer policy.

PAM 423 Risk Management and Policy
Spring. 3 credits. Prerequisite: Econ 101 and a course in statistics. Enrollment limited to 80. S. Tennyson.
The objective of this course is to provide students with a broad understanding of risk management problems and solutions, a greater appreciation of the importance of risk and risk regulation in our society, and increased comprehension of the complexities of making decisions about risk. Topics covered include alternative ways to define and measure risk, the importance of risk-tradeoffs, and models of decision making under risk. With this background, alternative approaches to risk management are discussed, including insurance, noninsurance financing alternatives, and loss control. The impact on risk management of the legal liability system and government programs, laws and policies are also considered.

PAM 424 Families in Business
Fall. 3 credits. Prerequisites: introductory statistics or permission of instructor. S-U grades optional. R. Heck.
Offers students the opportunity to explore family business topics such as business formation, growth and expansion, strategic management, professionalization, succession, locational choices, and family dynamics, conflicts, and relationships relative to the business. An overview of families who own businesses and the profiles of their businesses will be presented along with the examination of the course topics relative to the various stages of business activity including feasibility, start-up, ongoing maintenance, expansion or redirection, and exit or transfer. Case studies from the Harvard Business School series will be utilized to examine the course topics listed above. The course also provides an introduction to research on family businesses by surveying the conceptual issues and methodological approaches related to the study of family businesses.

PAM 426 Policy and Management Issues on Foreign Investment in China
Spring. 3 credits. P. Chi.
This course will help students understand the general investment environment in China and learn how social, cultural, political, and economic factors affect decisions on market entry strategies, marketing mix strategies, and other management strategies for foreign-invested enterprises (FIEs) in China. This course will not only examine the growth of FIEs since the 1980s, but also discuss the policy initiatives and institutional barriers for direct foreign investment in China. Both multiplier and linkage effects of foreign investment on China's economy will also be evaluated. Further, the management issues on formation, performance, profitability, and dissolution of FIEs will be systematically examined.

[PAM 427 Complementary Alternative Medicine
Fall. 3 credits. Prerequisites: a health course and intro biology or permission of instructor. Not offered 2001–2002. A. Parrot.
This course will particularly help pre-medical students, health administration students, and health economics students understand the relationship between alternative medicine and western allopathic medicine. The course will cover health and wellness, treatments for specific health conditions, differing philosophies of health care, financing health services, and cross-cultural approaches to these topics.]

PAM 435 The U.S. Health Care System
Fall. 3 credits. R. Battistella.
This course provides an introduction to the health care delivery systems in the United States, and covers the inter-relatedness of health services, the financing of health care, and the key stakeholders in health care delivery including regulators, providers, health plans, employers, and consumers. The course describes the history and organization of health care, behavioral models of utilization, issues of health care reform, and current trends. The course provides an overview of the key elements of the field including ambulatory care services, mental health services, hospitals and clinicians, insurers, the role of public health organizations, and the politics of health care in the United States.

[PAM 454 Contemporary Issues in Human Sexuality and Research
Spring. 4 credits. Permission of instructor required. Not offered 2001–2002. A. Parrot.
An in-depth seminar in theoretical and applied methodology for the study of human sexuality. Topics covered include current and contemporary issues, educational strategies, policy formation, legal jurisdiction, cultural mores, social attitudes, and individual sexual behavior.]

PAM 473 Social Policy
Spring. 3 credits. Prerequisite: PAM 383 or Government 111 or Sociology 141. S-U grades optional. J. Allen.
An examination of the policy-making process and the significance of national policies as they affect the distribution of social services. Frameworks for analyzing social policy are used to evaluate existing social programs and service-delivery systems. Implications for change in policies at the national, state, and local levels are discussed.

PAM 480 Professional Internship in Human Services
Fall or spring. 4–7 credits. Limited to juniors and seniors majoring in human service studies. Prerequisite: PAM 100. Precourse enrollment required. D. Tobias.
Students intern for a minimum of 10 hours a week in a human service organization and attend a weekly seminar or office hours with a focus on integrating classroom and field-based learning. The course is structured as an opportunity for students to learn experientially and, at the same time, provide meaningful services. Interns are expected to take active roles in structuring, monitoring, and assessing their learning under the guidance of a faculty instructor.

PAM 499 Honors Program
Fall or spring.
The honors program provides students with the opportunity to undertake basic or applied research which will be preparation of a thesis representing original work of publishable quality. The program is intended for students who desire the opportunity to extend their interests and efforts beyond the current course offerings in the department. Furthermore, the program is designed to offer the student the opportunity to work closely with a professor on a topic of interest. PAM majors doing an honors program may take PAM 499 for up to 15 credits. See Professor Alan Mathios for more details.

PAM 575 Housing and Long-term Care for the Elderly
Fall. 3 credits. S-U grades optional. P. Chi.
This course focuses on the housing of the elderly, their current housing conditions, and options for alternative housing. Housing is viewed as a resource of long-term care for the elderly, integrating housing with related health and social services. Attention is also given to government housing and long-term care programs for the elderly, analyzing how the residential environment influences the ability of elders to function independently and how it affects their need for long-term care services. Finally, the senior living and long-term care industries are examined.

PAM 600 Special Problems for Graduate Students
Fall and spring. Credits to be arranged. S-U grades optional. Staff.
Independent advanced work by graduate students recommended by their chair and approved by the department chair and the instructor.

[PAM 601 Introduction to Policy Analysis and Management

Fall. 3 credits. Not offered 2001–2002. Staff.
This course presents an overview of perspectives on U.S. social policies and programs with an emphasis on health, welfare, family, and consumer issues. Through readings and class assignments students are expected to demonstrate knowledge of: (1) the history and composition of major social policy and program interventions; (2) the role of political purposes and personal values in policy development, implementation, and analysis; (3) various methodological approaches for conducting policy and program evaluation research; and (4) the policy agenda-setting process and ways in which research findings are used in policy debates.]

PAM 602 Measurement and Validity in Policy Analysis and Management

Spring. 3 credits. E. Rodriguez.
This course provides an introduction to the theoretical foundations of validity in applied social research, basic probabilistic and nonprobabilistic sampling methods, survey research methods (including questionnaires, interviews, and scaling), and other practical inquiry methods are required for valid inferences.

PAM 603 Experimental, Quasi-Experimental, and Economic Evaluation Methods

Spring. 3 credits. E. Peters.
This course focuses on the logic of randomized experimentation, the role of structural experiments, quasi-experimental evaluation methods, nonexperimental regression techniques, issues of sample selection, and cost-benefit analysis.

[PAM 604 Qualitative and Mixed-Method Approaches to Policy Analysis and Management

Spring. 3 credits. Not offered 2001–2002. Staff.
This course introduces qualitative traditions of social inquiry and their roles in policy analysis and management. The course will also address visions of and strategies for mixing different inquiry traditions and approaches in applied policy analysis and management.]

PAM 605 Economics of Household Behavior

Fall. 3 credits. Prerequisite: PAM 604 or Economics 609–610 or consent of instructor. S-U grades optional. E. Peters.
This course examines household decision making in both single agent and multiple agent (e.g., game theoretic or bargaining) frameworks. The first half of the course focuses on: (1) fertility; (2) household production; (3) and time allocation models of behavior—decisions that are usually modeled in a single-agent framework. The second half of the course looks at: (1) marriage markets; (2) family formation and dissolution; (3) bargaining models of resource allocation within the household; (4) and intergenerational transfers across households. These kinds of behaviors are more fruitfully studied using multiple agent models such as contract theory, game theory, and household bargaining. Empirical applications of the theoretical models are presented for both developed and developing countries. Implications for family policies such as child care subsidies, divorce laws, family planning, government subsidies to education, and social security are also discussed. Much of the material covered by this course could also be found in economic demography and economics of the family courses.

PAM 606 Demographic Techniques (also Rural Sociology 608)

Fall. 3 credits. S-U grades optional. Staff.
This course provides an introduction to the methods, measures, and data used in the analysis of human populations. Topics include demographic rates, life-table analysis, cohort versus period analysis, sources and quality of demographic data, population estimation and projection, and stable population models.

PAM 608 Economics of Consumer Demand (also ARME 670)

Fall. 3 credits. Prerequisite: PAM 200, Economics 313, or concurrent enrollment in one of the 2, and 2 semesters of calculus. S-U grades optional. C. Ranney.
A graduate level introduction to theory and empirical research on household demand, consumption, and saving. Emphasis is on the use of the theory in empirical research. Topics include neo-classical theory of demand, duality, complete demand systems, conditional demand, demographic scaling and translating, consumption, and savings. Becker and Lancaster models of demand will be introduced.

PAM 616 Strategies for Policy and Program Evaluation

Fall. 3 credits. Prerequisites: PAM 612 and 613 or 617 or equivalent. W. Trochim.
This course examines a wide range of approaches to the evaluation of policies and programs in the human services. The approaches are examined with respect to their purposes, key audiences, and methodologies, as well as their philosophical, political, and value frameworks. Analysis of commonalities and differences across evaluation approaches are used to judge the appropriateness of a given strategy for a particular context.

PAM 632 The Intergovernmental System: Analysis of Current Policy Issues

Fall. 3 credits. Open to seniors who have had a course in American government and to graduate students. J. Ziegler.
This course offers advanced policy analysis of current political/social/economic issues in the context of the intergovernmental system. Particular attention is paid to how certain policy and human service issues are played out at the federal, state, and local levels of government, and to the formulation of federal and state budget policy. General public administration theory is considered. Students work in teams on a policy/administrative research project and report to the class.

PAM 647 Microeconomics for Management and Policy

Fall. 4 credits. S-U grades optional. S. Tennyson.
This course introduces microeconomic theory and its application to decision making in the management and policy arenas. Special emphasis will be placed on the economic environment of health care organizations and the problems faced by managers in this environment.

PAM 650 Applications in Health Management Practice, Enterpreneurship and Consulting

Spring. 3 credits. J. Kuder.
Seminars and practica, offered periodically and reflecting faculty and student interest, with changing topics and instructors. Content, time, credits, and instructors to be announced. Seminars and practica offer concentrated study in a specific human service area or in the education, planning, or evaluation processes within human services.

[PAM 652 Health Care Services: Consumer and Ethical Perspectives

Fall. 3–4 credits. Limited to 30 students; undergraduates with permission of instructor. 4-credit option, may be used as Biology and Society Senior Seminar option. Not offered 2001–2002. A. Parrot.
The course will focus on consumer and ethical issues faced by the health care field today. Broad topics to be discussed include ethical standards and guidelines, health care costs and accessibility of services, government role in health care delivery, health care as a right or privilege, private industry role in health care, services for the medically indigent and elderly, practitioner burnout and training, ethics of transplant surgery and funding, reproductive technology, AIDS research and funding, animals in medical research, right to die, and baby and granny Doe cases.]

[PAM 653 Health Economics and Policy

Spring. 3 credits. Prerequisites PAM 604. Econ 609 or permission of instructor. S-U grades optional. Not offered 2001–2002. D. Kenkel.
This course provides an overview of research in health economics and its relevance for health policy. Models of health capital, household production, and insurance are developed and used to address public health policies and health insurance programs and reforms. Major issues in the economics of the health care sector are discussed, including the markets for physician services, hospital care and long-term care. Much of the course focuses on the United States, but it will also review research on other countries, especially developing countries that face a very different set of health policy issues.]

PAM 654 Legal Aspects of Health Care

Spring. 3 credits. Prerequisites: PAM 657 or permission of instructor. Taught in alternate years. H. Allen.
This course introduces principles of the law that are specifically applicable to health-service delivery. Topics considered include: the liability of hospitals and their staff and personnel for injuries to patients; medical records and disclosure of information; consent to medical and surgical procedures; responsibility for patients' personal property; collection of bills; medical staff privileges; and confidential communications.

PAM 656 Managed Health Delivery Systems: Primary-Ambulatory Care

Spring. 3 credits. Prerequisite: PAM 657. J. Kuder.
The concept of primary care is used to enhance understanding of the direction and purpose of ongoing changes in health services organization and financing. Pressures on traditional indemnity insurance and solo fee-for-service medicine are examined in the context of the transition from unmanaged to managed delivery systems. The course is divided into two parts. Part 1 examines the development of health maintenance organizations and related forms of managed care against the backdrop of larger public policy concerns. Part 2 centers on administrative-financial topics associated with the design, marketing, and operation of managed delivery systems in highly competitive markets.

Considerable attention is given to the relationship between physicians and management with respect to such subjects as medical practice styles, productivity, quality assurance, and outcome measurement. Many of the managerial topics are highlighted with field trips and visiting speakers.

PAM 657 Health Care Organization
Fall. 3 credits. Limited to 30 students. Priority given to Sloan students or permission of the instructor. R. Battistella.
The course will provide an introduction at the graduate level to the organization of health providers in the United States, the interrelationships of health services and the major sources and methods of paying for care. The course will describe how health services are structured in the United States and how these different services interrelate along the continuum of care. The course will describe and analyze organization, delivery, and financing issues from a variety of perspectives using specific performance criteria (e.g., equity, quality, efficiency). Innovations by the public and private sectors in the delivery and reimbursement of health care will also be presented.

PAM 658 Field Studies in Health Administration and Planning
Fall or spring. 1–4 credits. Staff.
Students interested in developing administrative and program-planning research skills are given an opportunity to evaluate an ongoing phase of health care agency activity in the light of sound administrative practice and principles of good medical care. In planning and carrying out the research, students work closely with a skilled practicing administrator and with members of the faculty.

PAM 659 Epidemiology, Clinical Medicine, and Management Interface Issues
Spring. 3 credits. E. Rodriguez.
From an empirical and analytical framework this course explores the relationships between epidemiology, clinical medicine, and management. The course will review the epidemiology, policy issues, and treatment of selected diagnoses accounting for a significant percentage of utilization and cost of health care services. In addition, students will have an opportunity to explore issues of resource allocation and continuous quality improvement. The format for the class is lecture, discussion, and case analysis.

[PAM 660 Quality in Health Care Organizations
Fall. 3 credits. Not offered 2001–2002. Staff.
The quality of health services—the extent to which the appropriate and most effective care is properly administered in the least costly manner—is a topic of paramount importance to patients. It is also a central concern of the providers and managers of health services and those who pay for care. It is a cornerstone of health care reform. Through readings, lecture, discussion, and group work, this course will acquaint the student with the basic elements of managing quality in health care organizations including: defining quality from many perspectives; measuring performance and detecting poor quality care; traditional and progressive approaches to managing quality including Continuous Quality Improvement; and the politics of quality, both within and outside the organization.]

PAM 661 Economics of Health and Medical Care
Spring. 3 credits. J. Schultz.
The course is designed for graduate students who seek an understanding of the tools, vocabulary, and means of thinking about economics as it applies to decision making in health services delivery, administration, and policy. This course will examine the special features of medical care as a commodity, the demand for health and medical care services, the economic explanations for the behavior of providers, the functioning of insurance markets, health policy issues, federal health insurance programs, and regulation. In addition, this course will introduce students to methods of analyzing the economic consequences of alternative health care policies.

PAM 662 Health Care Financial Management I
Spring. 3 credits. Staff.
The course is designed to give graduate students an intensive introduction to the issues and techniques in the financial management of health service organizations. Class lectures, readings, guest speakers, problems, case studies, and research for term paper/projects will all be used to demonstrate important points, which will be reinforced by examples and applications. The course emphasizes the internal financial management knowledge and skill necessary for financial success in complex health organizations.

PAM 663 Health Care Financial Management II: Payment Systems
Fall. 3 credits. Prerequisite: PAM 662. J. Kuder.
The purpose of this course is to develop an understanding of the theories on which health care payment and reimbursement systems are based and the techniques by which they operate.

PAM 664 Information Resources Management in Health Organizations
Spring. 3 credits. Recommended: strong basic computer skills. S-U grades optional. L. O'Neill.
Students are expected to have basic computer skills upon entry into the course. This course is a graduate course in Health Services Administration. Students will be exposed to the opportunities and challenges inherent in the use of health management information systems (HMISs) in clinical and nonclinical applications. The course focuses on the manager's role in the application of HMISs to solve problems and address concerns in today's health care service industry. Students will learn how an HMIS can enhance the ability to appraise multiclinical and nonclinical services of care.

[PAM 665 Managing Health and Human Service Organizations I
Fall. 3 credits. Not offered 2001–2002. Staff.
This is the first segment of a six-credit sequence addressing the management and leadership of health and human services organizations. Different perspectives are examined, from that of the first-line supervision to the CEO level. This course begins with a study of the basics of management—communications, motivation, change management, leadership, human resources, organizational design issues, and labor relations. It then looks at the development of technical skills in the areas of problem solving, decision making, productivity measurement, resource allocation and performance measurement. The course is taught with an applied focus and utilizes a case study approach.]

PAM 666 Strategic Management and Organizational Design of Health Care Systems
3 credits. Prerequisite: PAM 665. Staff.
This is the second segment of a six-credit sequence in the management and leadership of health and human services organizations. This course concentrates on strategy issues, marketing, organizational culture issues, development of mission, the management of professionals, and studies the importance of roles, structure, and inter- and intra-institutional relationships within these organizations. The course is taught via a case study approach.

PAM 667 Health and Welfare Policy
Spring. 3 credits. J. Schultz.
This course addresses major health policy issues and the critical processes that influence them. It focuses primarily on the United States, with some coverage of health policy in other countries. Topics that will be discussed include: Medicare, Medicaid, the uninsured, public health, the effect of welfare policy on health care, managed care development and regulation, state and federal health care reform, and many others. The course analyzes the politics of health policy in terms of legislative and executive processes; the forces involved including economic, social, ethical and political factors; and key players in health policy, such as special interest groups, lobbyists, public agencies, the press, elected officials, and legislative staff.

PAM 668 Long-Term Care and the Aged: Alternative Health and Social Service Delivery Systems
Spring. 3 credits. Prerequisite: PAM 657. R. Battistella.
Alternatives for the organization and delivery of long-term care services are examined within the context of public-financing constraints. Progressive long-term care is viewed as a continuum encompassing medical and social services positioned to optimize independent living. Relevant experience from other highly developed countries is presented. Visiting speakers from the public and private sectors are featured. Field trips provide additional insights into the many challenges and opportunities of long-term care policy and management.

PAM 669 Regression Analysis and Managerial Forecasting
Fall. 3 credits. Prerequisite: at least one statistics course. L. O'Neill.
This course teaches various statistical methods for managerial decision making, with a particular emphasis on regression and forecasting. Other topics include: ANOVA, correlation, confounding, interaction, and statistical process control. Applications to health care organizations are emphasized.

[PAM 718 Advanced Seminar in Program Evaluation
Fall, spring. 1–3 credits. S-U grades optional. Prerequisite: permission of instructor. Not offered 2001–2002. Staff.
This advanced course is intended for students with at least three courses in evaluation (PAM 612 series or the equivalent) and statistics through multiple regression. The seminar focuses on analysis and appraisal of current literature on program evaluation and evaluative research. The seminar is topical,

addressing current issues of importance in the field.]

PAM 760 Challenges and Trends in the Health Services Industry
Fall and spring. 1 credit. S-U grades only. Staff.
The goal of the course is to provide students with information and exposure to current and emerging issues in the health services industry. Topics may include such matters as: financial management of health care facilities, human resource management, information systems, cost effective clinical decision making, quality measurement and outcomes, public health, and entrepreneurship in the health services industry.

PAM 799 MPS Problem Solving Project
Fall or spring. Credits to be arranged. For students recommended by their chair and approved by the instructor in charge of independent advanced work. S-U grades optional.

PAM 899 Master's Thesis and Research
Fall and spring. Credit to be arranged. Prerequisite: permission of the chair of the graduate committee and the instructor. S-U grades optional.

PAM 999 Doctoral Thesis and Research
Fall and spring. Credit to be arranged. Prerequisite: permission of the chair of the graduate committee and the instructor. S-U grades optional.

TEXTILES AND APPAREL

A. Lemley, chair; S. K. Obendorf, director of graduate studies; A. Racine, director of undergraduate studies; S. Ashdown, C. C. Chu, C. Coffman, C. Jirousek, S. Loker, A. Netravali

Note: Class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

TXA 114 Introduction to Computer-Aided Design
Fall and summer. 3 credits. It is important for students on wait lists to attend the first class. Limit 23 per lab section. Priority given to all TXA and other freshmen and sophomore students. Not open to those who have taken or are currently enrolled in DEA 115 and 203. Minimum cost of materials $60; lab fee $15. S-U grades optional. Fall, T or R 1:25–4:25. A. Racine.
A studio course that explores the creative potential of microcomputers. The AutoCAD software program is used as a design tool for generating a wide variety of visual images. Basic Photoshop software commands are introduced to enhance AutoCAD drawings. Daily hands-on demonstrations and studio work. Students develop two-dimensional designs based on historical, cultural, and museum sources for portfolios and display.

TXA 117 Drawing the Clothed Figure
Spring. 3 credits. Enrollment limited to 20 students. Prerequisite: a basic drawing course. Priority given to apparel design students. Letter grades only. Minimum cost of supplies $125.00. Lab fee: $30. T R 10:10–1:10. Staff.
The goal of this course is to improve a student's capacity to communicate apparel design ideas visually by drawing clothing on the human body. Emphasis will be placed on development of techniques used to express the human body, materials, and clothing designs quickly and clearly in working sketches and to present clothing designs in finished renderings.

TXA 125 Art, Design, and Visual Thinking
Fall. 3 credits. S-U grades optional. Lecs M W F 12:20–1:10. C. Jirousek.
An introduction to the visual arts and design that explores aesthetic and cross-cultural dimensions of visual experience. Augmented by slide presentations, artifacts, video, and an Internet-based electronic textbook, lectures emphasize the varieties of visual expression seen in works of art and design. Social, cultural, and historic interpretations of visual expression are discussed.

TXA 135 Fibers, Fabrics, and Finishes
Spring. 3 credits. S-U grades optional. Lecs M W F 9:05–9:55. A. Netravali.
An introduction to fibers, fibrous materials, and dyes and finishes. Special emphasis is given to the use of fibrous materials in apparel, residential and contract interiors, and industrial applications. Topics covered include fiber properties, fabric structure, coloration of fibrous materials, dimensional stability, flammability, product specifications, and performance standards.

TXA 145 Introduction to Apparel Design
Spring. 4 credits. Limited to 36 students with 18 students per lab section; priority given to all TXA, other freshmen and sophomore students, and students transferring into TXA; not open to seniors outside of TXA. Letter grades only. Apparel design majors should take course during the first year. Minimum cost of materials, $140. Lec T 1:25–4:25 and lab F 10:10–12:05 or lec R 1:25–4:25 and lab F 12:20–2:15. A. Racine.
Intensive study of principles and processes of flat-pattern design with emphasis on creative expression in children's apparel. Students develop an understanding of the techniques needed to produce apparel from sketches, including patternmaking and garment assembly.

TXA 225 Color and Surface Design of Textiles
Fall. 4 credits. Recommended: TXA 114 and TXA 135. Minimum cost of other materials, $100; lab fee, $75. Preference given to TXA majors. T R 1:25–4:25. C. Jirousek.
Studio experience in the surface design of textiles combined with exercises in color theory. Textile projects will use techniques such as block printing, shibori, batik, silk painting, silk screen, and stitchery to produce a portfolio of textile designs. Studio work will be augmented by lectures on pattern and color theory illustrated by slides and textile examples.

TXA 237 Structural Fabric Design
Fall. 3 credits. S-U grades optional. Prerequisite: TXA 135. Recommended: college algebra. Lecs M W F 9:05–9:55. Staff.
This course covers the elements of technical fabric design with an emphasis on woven and knitted fabrics. Topics include structure of woven and knitted fabrics, openness, manufacturability, equivalence, and color effects.

TXA 264 Draping
Fall. 4 credits. Limited to 26 students; 13 in each lab. Prerequisite: TXA 125 and TXA 145; one drawing course recommended. Minimum cost of materials, $125; lab fee, $10. Lec 01 M 2:55–4:10; lab 01 W 1:25–4:25; lab 02 F 10:10–1:10. S. Ashdown.
This studio course examines the process of creating a three-dimensional garment from the two-dimensional fabric. The principles and processes of draping, advanced flat pattern making, and fitting are studied through projects. Drawing exercises focus on the communication of three-dimensional garments in two-dimensional sketches. Assigned problems require the students to make judgments regarding the design process, the nature of materials, body structure, function, and fashion.

TXA 269 Style, Fashion, and the Apparel Industry
Spring (first 7 weeks of semester). 2 credits. Limited to 40 students. Recommended: TXA 125 and TXA 135. Not open to freshmen. S-U grades optional. Lec M W 2:30–4:25. A. Racine.
Illustrated lectures will focus on changes in the U.S. apparel industry and fashion from the nineteenth century to the present day due to social forces, technological developments, and shifting demographics. The Cornell Costume Collection will be used for discussion. Students will write a term paper on issues relating to the fashion industry.

TXA 275 Photoshop for Portfolio Presentations in Textiles and Apparel
Spring (first 7 weeks of semester). 2 credits. Limited to 23 students. Prerequisite: TXA 114, TXA 217, or TXA 225. Course fee covering CAD lab color printing, $15.00. T R 1:25–4:25. C. Jirousek.
This course will explore the use of Adobe Photoshop as a tool for portfolio development in textile and apparel design. Building on studio work produced in other courses, students will learn the basics of Photoshop and create a design line for a formal portfolio that will involve textile design applied to either apparel or home furnishings use.

TXA 300 Special Studies for Undergraduates
Fall or spring. Credit to be arranged. Staff.
Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multicopy description of the study they want to undertake on a form available from the College Registrar's Office. The form, signed by both the instructor directing the study and the department chair, is filed at course registration or during the change-of-registration period.

TXA 331 Apparel Production and Management
Fall. 3 credits. Enrollment limited to 45 students. Prerequisites: Economics 101 and 102 and an upper-division course in either apparel or textiles. M W 12:20–2:15. A. S. Loker.
Introduction to the global textile and apparel industry, particularly the technical and economic aspects of apparel production. Analysis of specific apparel manufacturing and management issues such as international sourcing, Quick Response, mass customization, production and information technology, labor, and logistics.

TXA 332 Designers as Entrepreneurs
Fall. 1 credit. Enrollment limited to 45 students. Prerequisite: any design course. S-U grade optional. T 12:20–1:10. S. Loker.
This course will present issues that are critical to designers who are entrepreneurs, such as product development and maintenance; sourcing materials, assembly, and other services; copyright, trademark, and patents; branding and licensing; mass customization; distribution options including e-commerce; and social responsibility in business. The course will draw extensively on guest speakers and case studies.

TXA 335 Fiber Science
Spring. 3 credits. Limited to 20 students. Prerequisites: college chemistry and physics. Lecs T R 1:25–2:15. Lab T 2:30–4:25. A. Netravali.
This course covers fibers commonly used in various engineering, medical, and apparel applications. Topics include the nature of polymer molecules, the chemical structure of organic fibers, inorganic fibers, micro-macro structure of fibers, fiber dimensions, environmental effects, and mechanical, optical, thermal, and frictional properties of fibers. The following fiber uses will be discussed: composites in aerospace and other structural components, circuit boards, bulletproof vests, sutures, artificial arteries, geotextiles, sporting goods, and others.

TXA 336 Fundamentals of Color and Dyeing
Fall. 3–4 credits. 3 credits for lecture only; 4 credits for lecture and lab. Prerequisite: college Natural Science Requirements. Fiber science students are required to take the lab. Lab fee, $15. Lecs M W F 10:10–11:00; lab M 1:25–4:25. C. C. Chu.
Color is extremely important and useful in daily life. This course will emphasize theories and scientific principles of color, providing a framework for the use of color in design, marketing, or research. How colorants are used to dye fabrics will be addressed. Although fabrics are chiefly used to illustrate color in the class, much of the information and knowledge will be useful to nontextile majors. Guest lecturers from the industry will address the practical aspects of color in business.

TXA 346 Apparel Design Process and Pattern Development
Spring. 4 credits. Enrollment limited to 26. Prerequisite: TXA 135 and TXA 145. Letter grades only. Minimum cost of materials, $125; lab fee, $10. M W 1:25–4:25. Staff.
This studio course applies the principles and processes of advanced pattern making and the theory of functional clothing to the development of sportswear, actionwear, and clothing for active leisure activities. Assigned problems will require students to use the design process to apply information about body structure, user needs (thermal protection and comfort, mobility, and visibility), and the nature of materials to the production of functional, fashionable apparel. Drawing techniques that emphasize the communication of technical information about the design will be taught.

TXA 368 Computer-Aided Apparel Design
Fall. 3 credits. Prerequisite: TXA 114, TXA 145. Pre or co-requisite: TXA 264. Minimum cost of materials, $60. M W 10:10–12:05. A. Racine.
A team-based studio course in which a finished line of apparel is completed with patterns, sketches, flat drawings, and cost sheets created on the computer. This is an appropriate product development course for management students who have taken TXA 114 and TXA 145.

TXA 400–401–402–403 Special Independent Studies for Undergraduates
Fall, summer, or spring. Credits to be arranged. S-U grades optional. Staff.
For advanced independent study by an individual student or for study on an experimental basis with a group of students in a field of TXA not otherwise provided through course work in the department or elsewhere at the university. Students prepare a multicopy description of the study they want to undertake on a form available from the department office. This form must be signed by the instructor directing the study and the department chair and filed at course registration or within the change-of-registration period after registration along with an add/drop slip in 145 MVR, College Registrar Office. To ensure review before the close of the course registration or change-of-registration period, early submission of the special-studies form to the department chair is necessary. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study.

TXA 400: Directed Readings. For study that predominantly involves library research and independent reading.

TXA 401: Empirical Research. For study that predominantly involves data collection and analysis, or laboratory or studio projects.

TXA 402: Supervised Fieldwork. S-U only. For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

TXA 403: Teaching Apprenticeships. Fall or spring. 2–4 credits. Prerequisites: student must have upperclass standing, have demonstrated a high level of performance in the subject to be taught and in the overall academic program, and have permission of the instructor and the department chair. S-U grades optional. Staff. Apprenticeship includes both a study of teaching methods in the field and assisting the faculty with instruction.

TXA 432 Product Quality Assessment
Fall. 3 credits. Enrollment limited to 36 in lecture and 18 in each lab section. Prerequisites: TXA 135 and Statistics. Lab fee, $15. Lecs M W 11:15–12:05; lab M or W 2:30–4:25. N. Breen.
This course covers evaluation of fibers, yarns, fabrics, and garments, with emphases on the meaning of standards, testing philosophy, quality control, and statistical analysis. Day-to-day tests done in textile and apparel industry will be discussed. Laboratory sections will introduce students to various test methods, data generation for analysis, and evaluation.

TXA 436 Fiber Chemistry
Spring. 3 credits. S-U grade optional. Senior and first-year graduate students. Lecs M W F 10:10–11:00. Offered alternate years. C. C. Chu.
The chemical and physical structure of several commercially important fibers, such as cotton, wool, silk, polyesters, nylons, acrylics, polyolefins and spandex, and their polymerization process are discussed. The general chemical and physical properties of each will be given. Degradation reactions for certain fibers such as polyolefins and acrylics will be discussed.

TXA 439 Biomedical Materials and Devices for Human Body Repair
Spring. 2–3 credits. 2 credits meets T only; 3 credits meets T and R. S-U grades only for 2 credits, letter grades only for 3 credits. Juniors and seniors only. Prerequisites: college Natural Science requirement. (Chem. or Biol.). T 1:25–2:40, R 1:25–2:40. C. C. Chu.
Survey of materials and devices for repair of injured, diseased, or aged human tissues/organs. It includes properties of synthetic and biological materials, wound healing processes, medical devices for repair of wounds, blood vessels, hearts, joints, bones, nerves, male impotence, vision/hearing/voice, and drug control/release.

TXA 444 Apparel/Textile Retailing and Distribution
Spring. 3 credits. S-U grades optional. Juniors and seniors only. Prerequisite: TXA 135, TXA 331, and ARME 240 or equivalent. Lec T R 1:25–2:40. N. Breen.
This course provides an overview of the business of design, production, distribution, marketing, and merchandising of apparel and related products from a management perspective. The organization and structure of both domestic and international retailers is included along with pricing strategies, merchandise planning, inventory management, and sales promotion. New uses of computer systems and information technologies will be emphasized throughout.

TXA 465 Apparel Design: Product Development
Fall. 3 credits. Prerequisites: minimum of 2 drawing or art courses, TXA 264, TXA 368, and TXA 225 or permission of instructor. Minimum cost of materials, $250; lab fee, $10. T R 10:10–12:05. S. Ashdown.
Through studio problems in apparel design, students examine the influence of manufacturing technology and cost on apparel products. Garments are developed to various stages from sketches to finished samples. Sketching exercises explore the relationship between technical drawing and illustration. Some portfolio development included.

TXA 499 Honors Thesis Research
Fall and spring. 1–6 credits (maximum 6 credits for graduation). S-U grades optional. Prerequisite: TXA students who have been admitted to college honors program. Staff.
Independent research leading to the honors thesis. College honors program guidelines are to be followed.

TXA 600 Special Problems for Graduate Students
Fall or spring. Credit to be arranged. S-U grades optional. Staff.
Independent advanced work by graduate students recommended by their chair and approved by the department chair and instructor.

[TXA 620 Physical Properties of Fiber-Forming Polymers and Fibers
Fall. 3 credits. Prerequisite: permission of instructor. Offered alternate years. Not offered 2001–2002. A. Netravali.

Formation and properties of fiber-forming polymers, rubbery, glassy, and crystalline states and their interconnection. Fiber structure, relationship between chemical structure and physical properties of manufactured and natural fibers. Mechanical, thermal, and viscoelastic properties of fibers and testing methods will be discussed.]

[TXA 626 The Chemistry of Textile Finishes and Dyeing

Spring. 3 credits. S-U optional. Prerequisites: TXA 336 or equivalent and organic chemistry, or permission of instructor. Offered alternate years. Not offered 2001–2002. C. C. Chu.

Chemical aspects of textiles with emphasis on finishes and dyeing are discussed. Industrially important textile chemicals used for dyeing and enhancing fiber and fabric properties, such as durable press, anti-soiling, water repellency will be studied. The emphasis is on the correlation of the observed effect with chemical structure, end-use influences, interaction with fabric and fibers, sources, and synthetic routes. The environmental effect of these textile chemicals and current federal regulation will be briefly discussed.]

TXA 637 Research Seminars in Apparel Design

Fall and spring. 1 credit; S-U only; repeat of course each semester is encouraged for all apparel design graduate students. Available to advanced undergraduate students with permission of individual instructor. Apparel Design faculty.

TXA 639 Mechanics of Fibrous Assemblies

Fall. 3 credits. Prerequisite: solid mechanics or permission of instructor. Offered alternate years. M W F 11:15–12:05. Staff.

A study of the mechanics of fiber assemblies: idealized yarn and fabric models; statistical bundle theories; deformation of yarns and fabrics in tensile, shear, and compressive stress; bending and buckling; and the mechanical behavior of nonwoven textile materials.

TXA 664 Human Factors: Anthropometrics and Apparel

Spring (even-numbered years). 3 credits. S-U grades optional. Prerequisites: course in statistics and permission of instructor. Open to advanced undergraduates. Offered alternate years. T R 10:10–12:05. S. Ashdown.

Seminar course focusing on the human form and its relationship to clothing. Includes discussion of quantification of body sizes and human variation; historical, cultural, and aesthetic concepts of fit; apparel sizing techniques; national and international sizing systems and standards; impact of sizing systems on various populations (elderly, handicapped, etc.).

TXA 666 Formation of Manufactured Fibers

Spring. 3 credits. Prerequisites: Organic chemistry, college physics, TXA 436, TXA 620, or permission of the instructor. S-U grades optional. Offered alternate years beginning 2001. M W F 2:30–3:25. Staff.

This course covers the practical and theoretical analysis of the chemical and physical principles of the methods of converting bulk polymer to fiber; rheology; melt, dry, and wet polymer spinning; fiber drawing; heat setting; and general theory applied to unit processes.

[TXA 675 Aesthetics and Meaning in World Dress

Spring. 3 credits; S-U grades optional. Prerequisites: TXA 125 or course in history of art, costume history, or other history. Offered alternate years. Not offered 2001–2002. C. Jirousek.

An examination of the aesthetic and social/psychological relationship between body and clothing in the context of various cultures. Students will develop a research topic to be presented orally and in a term paper, and they will participate in the development of an exhibition.]

TXA 899 Master's Thesis and Research

Fall or spring. Credits to be arranged. Prerequisite: permission of the chair of the graduate committee and the instructor. S-U grades optional. Staff.

TXA 999 Doctoral Thesis and Research

Fall or spring. Credit to be arranged. Prerequisite: permission of the chair of the graduate committee and the instructor. S-U grades optional. Staff.

FACULTY ROSTER

Allen, Josephine A., Ph.D., U. of Michigan. Assoc. Prof., Policy Analysis and Management

Ashdown, Susan, Ph.D., U. of Minnesota. Assoc. Prof., Textiles and Apparel

Avery, Rosemary J., Ph.D., Ohio State U. Prof., Policy Analysis and Management

Battistella, Roger M., Ph.D., U. of Michigan. Prof., Policy Analysis and Management

Becker, Franklin D., Ph.D., U. of California at Davis. Prof. and Chair, Design and Environmental Analysis

Brannon, Patsy, Ph.D., Cornell U. Prof., Nutritional Sciences, Dean

Brumberg, Joan J., Ph.D., U. of Virginia. Prof., Human Development

Burkhauser, Richard, Ph.D., U. of Chicago. Prof. and Chair, Policy Analysis and Management

Butler, J.S., Ph.D., Cornell U. Prof., Policy Analysis and Management

Casasola, Marinella, Ph.D., U. of Texas, Austin. Asst. Prof., Human Development

Ceci, Stephen J., Ph.D., U. of Exeter (England). Prof., Human Development

Chi, Peter S., Ph.D., Brown U. Prof., Policy Analysis and Management

Chu, Chih-Chang, Ph.D., Florida State U. Prof., Textiles and Apparel

Cochran, Moncrieff, Ph.D., U. of Michigan. Prof., Human Development

Cornelius, Steven W., Ph.D., Pennsylvania State U. Assoc. Prof., Human Development

Danko, Sheila, M.I.D., Rhode Island School of Design. Assoc. Prof., Design and Environmental Analysis

Depue, Richard, Ph.D., U. of Oklahoma. Prof., Human Development

Eckenrode, John J., Ph.D., Tufts U. Prof. and Chair, Human Development

Elliott, John, M.E. Des., U. of Calgary. Asst. Prof., Design and Environmental Analysis

Eshelman, Paul E., M.F.A., U. of Illinois. Assoc. Prof., Design and Environmental Analysis

Evans, Gary, Ph.D., U. of Massachusetts at Amherst. Prof., Design and Environmental Analysis

Ewert, D. Merrill, Ph.D., U. of Wisconsin at Madison. Assoc. Prof., Assoc. Dean

Garbarino, James, Ph.D., Cornell U. Prof. and Co-Director, Family Life Development Center

Gerner, Jennifer L., Ph.D., U. of Wisconsin. Prof., Policy Analysis and Management, Assoc. Dean

Gibson, Kathleen J., M.A., Ohio State U. Asst. Prof., Design and Environmental Analysis

Greene, Katrina, Ph.D., U of Virginia. Asst. Prof., Human Development

Hamilton, Stephen F., Ed.D., Harvard U. Prof., Human Development, Co-Director, Family Life Development Center

Haugaard, Jeffrey, Ph.D., U. of Virginia. Assoc. Prof., Human Development

Hazan, Cindy, Ph.D., U. of Denver. Assoc. Prof., Human Development

Heck, Ramona K.Z., Ph.D., Purdue U. Prof., Policy Analysis and Management

Hedge, Alan, Ph.D., U. of Sheffield (England). Prof., Design and Environmental Analysis

Jennings, Jan, M.S., Oklahoma State U. Assoc. Prof., Design and Environmental Analysis

Jirousek, Charlotte, Ph.D., U. of Minnesota. Assoc. Prof., Textiles and Apparel

Joyner, Kara, Ph.D., U. of Chicago. Asst. Prof., Policy Analysis and Management

Kenkel, Donald, Ph.D., U. of Chicago. Assoc. Prof., Policy Analysis and Management

Koslowski, Barbara, Ed.D., Harvard U. Assoc. Prof., Human Development

Kuder, John, Ph.D., U. of Michigan. Assoc. Prof., Policy Analysis and Management

Laquatra, Joseph Jr., Ph.D., Cornell U. Assoc. Prof., Design and Environmental Analysis

Lee, Lee C., Ph.D., The Ohio State U. Prof., Human Development

Lemley, Ann T., Ph.D., Cornell U. Prof. and Chair, Textiles and Apparel

Lewis, Vandyk, Ph.D., University of Central England, Birmingham. Asst. Prof., Textiles and Apparel

Loker, Suzanne, Ph.D., Kansas State U. Prof., Textiles and Apparel

Lust, Barbara C., Ph.D., City U. of New York. Prof., Human Development

Mathios, Alan, Ph.D., U. of Pennsylvania. Assoc. Prof., Policy Analysis and Management

Maxwell, Lorraine E., Ph.D., City U. of New York. Assoc. Prof., Design and Environmental Analysis

Moen, Phyllis, Ph.D., U. of Minnesota. Prof. and Director, Bronfenbrenner Life Course Center

Netravali, Anil, Ph.D., North Carolina State U. Prof., Textiles and Apparel

O'Neill, Liam, Ph.D., Pennsylvania State U. Asst. Prof., Policy Analysis and Management

Obendorf, Sharon K., Ph.D., Cornell U. Prof., Textiles and Apparel, Assoc. Dean

Parrot, Andrea, Ph.D., Cornell U. Prof., Policy Analysis and Management

Peters, H. Elizabeth, Ph.D., U. of Chicago. Assoc. Prof., Policy Analysis and Management

Pillemer, Karl A., Ph.D., Brandeis U. Prof., Human Development

Pollak, Patricia B., Ph.D., Syracuse U. Assoc. Prof., Policy Analysis and Management

Robertson, Steven S., Ph.D., Cornell U. Prof., Human Development

Rodriguez, Eunice, Ph.D., U. of California at Berkeley. Asst. Prof., Policy Analysis and Management

Savin-Williams, Ritch C., Ph.D., U. of Chicago. Prof., Human Development

Schultz, Jennifer, Ph.D., U. of Minnesota. Asst. Prof., Policy Analysis and Management

Sims, William R., Ph.D., Massachusetts Inst. of Technology. Prof., Design and Environmental Analysis
Tennyson, Sharon, Ph.D., Northwestern U. Assoc. Prof., Policy Analysis and Management
Tobias, Donald J., Ph.D., Michigan State U. Assoc. Prof., Policy Analysis and Managment
Trochim, William M. K., Ph.D., Northwestern U. Prof., Policy Analysis and Management
Wang, Q. I., Ph.D., Harvard Univesity. Asst. Prof., Human Development
Wethington, Elaine, Ph.D., U. of Michigan. Assoc. Prof., Human Development
Williams, Wendy M., Ph.D., Yale U. Assoc. Prof., Human Development

Lecturers

Beck, Sam N., Ph.D., U. of Massachusetts. Sr. Lecturer, Urban Semester
Beckmann, Randi, M.S., Elmira College. Lecturer, Human Development
Breen, Nancy, Ph.D., Syracuse University. Lecturer, Textiles and Apparel
Delara, Thomas, M.B.A., Barry University. Lecturer, Policy Analysis and Management
Dempster-McClain, Donna I., Ph.D., Cornell U. Sr. Lecturer, Human Development
Gilmore, Rhonda, M.A., Cornell U. Lecturer, Design and Environmental Analysis
Mitrano, Tracy, Ph.D., SUNY Binghamton. Lecturer, Human Development
Racine, Anita, Ph.D., Cornell U. Sr. Lecturer, Textiles and Apparel
Rosen, William, Ph.D., U. of California. Sr. Lecturer, Policy Analysis and Management
Ross-Bernstein, Judith, M.Ed., Northwestern U. Lecturer, Human Development
Roufaiel, Nazik, Ph.D., Cairo University. Lecturer, Policy Analysis and Management
Schelhas-Miller, Christine, Ed.D., Harvard U. Lecturer, Human Development
Waldron, Kristine, M.A., Syracuse University. Lecturer, Policy Analysis and Management

SCHOOL OF INDUSTRIAL AND LABOR RELATIONS

ADMINISTRATION

Edward J. Lawler, dean

Robert Smith, associate dean, academic affairs

Ann Martin, associate dean, extension and public affairs

James E. McPherson, assistant dean, Office of Student Services

Gordon Law, librarian

Allan Lentini, director, administrative services

Francine Blau, director, research

Christopher Haley, director, external relations

Robert Stern, graduate faculty representative

Tove Hammer, editor, *Industrial and Labor Relations Review*

DEGREE PROGRAMS

	Degree
Industrial and Labor Relations	B.S.
	M.I.L.R.
	M.P.S.
	M.S.
	Ph.D.

THE SCHOOL

The School of Industrial and Labor Relations at Cornell (ILR) is a small school within a large university. It tries to maintain the small-college atmosphere expected of an institution that has about 750 undergraduates and approximately 150 graduate students, even as ILR students participate fully in the activites of the larger Cornell community.

ILR students study in modern, technologically advanced lecture halls, seminar rooms, and libraries.

Almost half of the school's typical freshman class comes from the greater New York City area. Another 30 percent live in other parts of New York State. Students from other states and a few from foreign countries make up the rest of the class. Women constitute about 50 percent of entering classes, and minority students comprise about 25 percent of new freshmen and transfer students.

Students enrolled in the School of Industrial and Labor Relations at Cornell may take a substantial number of courses in the other six undergraduate colleges and schools of the university, including the College of Arts and Sciences. Cornell students have access to all of the libraries and other services of the university.

The school operates in four areas: (1) resident instruction, (2) extension and public service, (3) research, and (4) publications. It provides instruction to undergraduates and graduate students who are preparing for careers in industrial and labor relations, as well as to men and women already engaged in industrial relations activities and the general public through its Extension and Public Service Division.

The school's Conference Center, part of the extension division, initiates and hosts conferences covering the full scope of industrial and labor relations. The center provides continuing education and information to practitioners and scholars.

The Research Division develops materials for resident and extension teaching and originates studies in industrial and labor relations. The Publications Division publishes and distributes the research results.

GRADUATE DEGREES

More than 150 students on the Cornell campus are enrolled in graduate study in industrial and labor relations, one of the largest graduate fields in the university. Students may work toward the degrees of Master of Industrial and Labor Relations, Master of Professional Studies, Master of Science, and Doctor of Philosophy. For further information on graduate programs, contact the Graduate Office, School of Industrial and Labor Relations, Cornell University, 216 Ives Hall, Ithaca, NY 14853–3901.

DEPARTMENTS OF INSTRUCTION

Courses in the school are organized into six departments:

Collective Bargaining, Labor Law, and Labor History

In the study of workers, employers, and the government policies affecting them, members of this faculty concentrate on subjects of industrial and labor relations best understood by reliance on the fields of administration, economics, history, and law. Courses explore subjects within the framework of American society, stress fundamental forces of change, and analyze texts and empirical data with methods drawn from the social sciences, the humanities, and the legal professions.

Human Resource Studies

This department offers specialization in human resource studies. Human Resources focuses on employer-employee relationships and deals with such topics as human-resource planning, staffing, computer applications to personnel, personnel information systems, training, management development, performance appraisal, compensation administration, organization development, and the sociological environment of human resource management. The study of human resource policy focuses on government efforts to enhance the population's ability to be employed. Although primarily concerned with governmental measures that influence the supply of labor (for example, training, education, health, mobility, and immigration), the subject area also includes policies in private industry that relate to the demands for labor.

International and Comparative Labor Relations

International and Comparative Labor Relations is concerned with industrial and labor relations systems and labor markets in other parts of the world. Countries include those in Western Europe, as well as in Asia, Latin America, and South America.

Labor Economics

Labor Economics deals with labor markets: that is, the institutional arrangements, terms, and conditions under which workers supply their labor and under which firms demand their labor. Faculty members are especially concerned with understanding the workings of labor markets and the effects of various public policies. The topics dealt with in courses and research include the following: analysis of the labor force, employment and unemployment, wages and related terms of employment, income distribution, income security programs, health and safety in industry, retirement, pensions and social security, economic aspects of collective bargaining, and economic demography.

Organizational Behavior

By studying individuals, groups, single organizations, and associations or organizations, persons in the field of organizational behavior understand human behavior within organizations as well as the actions of the organizations themselves. At the individual level of analysis, courses consider motivation, leadership, attitudes, personality, group processes, organizational change, and worker participation. At the organizational level, courses examine occupations, deviance in the work place, conflict, power, organizational design, public policy regarding organizations, and industrial conflict. The department also offers courses on research methods in organizational research and general survey courses in both psychological and sociological research.

Social Statistics

Economic and social statistics includes the principles of statistical reasoning, statistical methods, and the application of statistical tools of analysis.

A full list of required and elective courses is available from the Office of Student Services, 101 Ives Hall.

RESIDENT INSTRUCTION

This division conducts the on-campus programs leading to the degrees of Bachelor of Science, Master of Industrial and Labor Relations, Master of Professional Studies, Master of Science, and Doctor of Philosophy from Cornell.

Office of Student Services

Staff members from the Office of Student Services, 101 Ives Hall, work closely with faculty and faculty committees to administer degree programs for the school and many of the school's support services. The office's responsibilities include the admitting and orienting of new students, maintaining students' personal and academic records, and counseling students on personal and academic problems. The office also works closely with seniors who are planning graduate study.

Counseling and Advising

New students are provided advising on orientation, academic procedures, and course registration by counselors in the Office of Student Services.

Each of the school's academic departments names faculty members to serve as advisers for students who wish to consult with them regarding career possibilities in the field, postgraduate programs, or similar matters. Questions or issues related to graduation requirements, course registration, and related academic procedures should be raised with counselors in the Office of Student Services.

Minority Programs

Cornell University administers a variety of special opportunity programs designed to provide financial assistance and other forms of assistance to (1) minority students and (2) low-income students meeting program guidelines. The purpose of these programs is to provide access to a Cornell education for capable students who otherwise might not secure the admissions consideration, financial assistance, or supportive services necessary for their success at the university. The associate director for minority education in the Office of Student Services provides academic and personal counseling to all ILR minority students. ILR offers a variety of support services to enhance academic achievement.

STUDY OPTIONS

Several study options are open to ILR undergraduates, making it possible to tailor a program to fit special circumstances.

One such option is the five-year ILR master's degree. With early planning, some students may earn the M.S. degree in the fifth year. Using another option, a very few ILR students arrange for dual registration in the Johnson Graduate School of Management, earning their bachelor's degree in ILR and a master's degree in the Johnson Graduate School of Management after five years of study.

Some students elect to spend a semester in New York City, Albany, or Washington, D.C., with a chance to observe actual labor problem solving as interns in congressional offices, labor organizations, personnel offices, and state and federal agencies. For more information, see "Special Academic Programs," below.

Study abroad options are also available at a number of foreign universities. Qualified students may spend a semester or a full year studying abroad.

A number of ILR courses deal directly with today's problems and involve fieldwork in the Ithaca area and elsewhere in New York State.

The ILR program allows juniors and seniors who want to conduct their own research to receive course credit for individually directed studies if the program is supervised by a faculty member.

Study in Absentia

Registration in absentia enables a student to seek admission in another American institution for a semester or a year and transfer credit toward completion of the Cornell degree. This study option requires the development of a plan of study, a statement of appropriate reasons for study away from the university (e.g., availability of courses not offered at Cornell), good academic standing, approval of the plan by the director of student services, and payment of a special in absentia registration fee. Course work taken in absentia is usually not evaluated for transfer credit until the work has been completed and the student has returned to Cornell. Students then submit a course syllabus and other evidence of content to the chairman of the department that might have offered the respective course, or to a counselor in the Office of Student Services if the course is more appropriate as a general elective.

Leave of Absence or Withdrawal

If a student desires to withdraw or to take a leave of absence from the university, an interview should be scheduled with a counselor in the Office of Student Services. Counselors will assist students in petitioning for approval of a leave of absence and in contacting the appropriate offices or departments of the university.

REQUIREMENTS FOR GRADUATION

To earn the Cornell Bachelor of Science degree in industrial and labor relations, the student needs to successfully complete 120 credits. This requires eight terms for an average of 30 credits a year although some students accelerate their studies.

Freshman Year

Fall Semester

Freshman Writing Seminar	3
Introductory Microeconomics (ECON 101)	3
History of American Labor: Nineteenth Century (ILRCB 100)	3
Social and Psychological Foundations of Organizational Behavior II (ILROB 171)	3
ILR Colloquium (ILRID 150)	1
Elective	3
	16

Spring Semester

Freshman Writing Seminar	3
Introductory Macroeconomics 102	3
History of American Labor: Twentieth Century (ILRCB 101)	3
Social and Psychological Foundations of Organizational Behavior I (ILROB 170)	3
Elective	3
	15

Physical Education, Fall and Spring

Sophomore Year

Fall Semester

Statistics I (ILRST 210)	3
Development of Economic Institutions (ILRLE 140)	3
Labor and Employment Law (ILRCB 201)	3
Human Resource Management (ILRHR 260) Fall	3
Elective	3
	15

Spring Semester

Statistics II (ILRST 211)	3
Economics of Wages and Employment (ILRLE 240)	3
Distribution: Cultural Perspectives	3
Distribution: Western Intellectual Tradition	3
Elective	3
	15

Junior and Senior Years

Economic Security (ILRLE 340)	3
Collective Bargaining (ILRCB 300)	3
Distribution: International and Comparative ILRIC	3
Distribution: Upper Division Writing	3
Distribution: Science and Technology	3

ILR and General Electives

ILR Electives—30 credits (one course must be ILRIC)

Minimum of 12 credits of ILR course work including 495 (Honors), 499 (Independent Study) and approved list of courses from the LE Department.

Maximum of 12 credits from foreign languages, advanced math or other non-ILR courses as approved by ILR departments.

9 credits for one semester abroad or 15 credits for a full year.

9 credits for Internships (497: 3 credits; 498: 6 credits S-U).

General Electives—34 credit hours of which up to 22 hours may be freely elected in the university's endowed divisions

Required Courses

(55 credits)

The curriculum prescribes the courses and subjects listed in the table above; some are illustrative. In the senior year, all courses will be electives.

Elective Courses

(65 credits)

From the courses offered by the school, students must select a minimum of 30 credits of ILR elective courses. No more than nine of these credits may be satisfied by ILR 497–498, Internships, or one semester of Study Abroad.

Undergraduates are required to select one intensive writing course (for a minimum of three credits) from a list of designated courses.

The remaining 34 credits may be selected from the courses of any other college at Cornell, but a student who takes more than 34 credits in the endowed colleges (the College

of Architecture, Art, and Planning; the College of Arts and Sciences; the Johnson Graduate School of Management; the College of Engineering; and the School of Hotel Administration) must pay for each credit taken in excess of 34, *whether or not the courses are passed*. For the precise fee per credit, students should call the Office of the Bursar.

The number of credits that may be taken in the endowed colleges at no additional cost to the student may be changed at any time by official action of the school.

ILR Math Requirement

If you took AP calculus in high school and scored a 3 or better on the AB exam or a 2 or better on the BC exam, you have fulfilled the ILR math requirement. If you did not take AP calculus, or if you did not achieve the scores noted above, you will be expected to take and pass the ILR Math Assessment before you may register for required courses in Statistics and Labor Economics. The Math Assessment is based on materials covered in New York State Regents Exams for Courses 2 and 3. (Calculus is not covered in those courses.)

The ILR Math Assessment will be scheduled in August, January, and May. Those who do not pass in the first attempt will be expected to register in an appropriate math course and pass the assessment *before the beginning of their third semester* in the school. Anyone who cannot meet the requirement by the beginning of the third semester may be enrolled for a terminal term and will be expected to leave the school thereafter.

Transfer students will be expected to meet the same standards in math: either present the score required by Cornell University for AP calculus (AB or BC) credit, or pass the ILR Math Assessment before being permitted to register in ILRST 210 or ILRLE 240 with a terminal semester possible after failing the assessment given at the beginning of a third semester as an ILR student.

SCHEDULING AND ATTENDANCE

Schedule Changes

Occasionally it may be necessary for a student to request changes in his or her course schedule either before a term begins or during the semester. Such requests must be directed to the Office of Student Services to avoid possible loss of academic credit.

Class Attendance

It is each student's responsibility to attend all scheduled classes unless excuses have been approved by the faculty. In some courses an instructor may permit a maximum number of class absences without a grade penalty or dismissal from the course. An explanation for absence from class may occasionally be secured from the Office of Student Services in advance of the expected absence. An approved absence may be warranted by:

1) participation in authorized university activities such as athletic events, dramatic productions, or debates;
2) medical problems supported by a record of clinic or infirmary treatment;
3) serious illness or death in the immediate family;
4) other circumstances beyond the student's control.

A request for explanation of an absence should, when possible, be made to the Office of Student Services before the date of expected absence. A reported and explained absence does not relieve a student from fulfillment of academic requirements during the period of absence. The course instructor has the authority to determine what work must be completed. The office can only confirm the explanation for absence. Students should inform the Office of Student Services of any problems they have meeting course requirements.

ACADEMIC STANDING AND GRADES

Academic Integrity

In 1987 the faculty of the School of Industrial and Labor Relations approved a revised code of academic integrity. This code, while based on the Cornell University code, varies somewhat.

Absolute integrity is expected of all Cornell students in all academic undertakings. They must in no way misrepresent their work, fraudulently or unfairly advance their academic status, or be a party to another student's failure to maintain academic integrity. The code specifically prohibits:

1) knowingly representing the work of others as one's own;
2) using or obtaining unauthorized assistance in any academic work;
3) fabricating data in laboratory or field work;
4) giving fraudulent assistance to others;
5) fabricating data in support of laboratory or field work.

Full details on the applications of those prohibitions to course work, term papers, examinations, and other situations are listed in the code. Copies are available from the Office of Student Services, 101 Ives Hall.

Dean's List

A Dean's List is compiled for each of the four undergraduate classes each term on the seventh day following receipt of final grades from the registrar. Eligibility for the Dean's List is determined by applying all of the following criteria:

1) achievement of a term average for freshmen of 3.3 or better; for sophomores of 3.4 or better; and for juniors and seniors of 3.6 or better;
2) a minimum course load for the term of 12 letter-graded credits;
3) completion of all courses registered for at the beginning of the term;
4) satisfaction of all good-standing requirements.

Academic Standing

Good standing requires that all of the following criteria be met at the end of each term:

1) an average of C– (1.7) for the semester's work, including a minimum of eight completed and letter-graded credits;
2) no failing grades in any course, including physical education;
3) a cumulative average of C– (1.7) for all completed terms.

If at the end of any term a student fails to maintain good standing or if overall academic performance is so marginal as to endanger the possibility of meeting school and university degree requirements, his or her record is reviewed by the Committee on Academic Standards and Scholarships. The committee may issue a written warning to the student at that time. If a student does not improve after the written warning, he or she may be denied permission to register for the next term.

Involuntary Separation from the School for Academic Reasons

A student may be denied permission to reregister at the end of any term when he or she has failed:

1) to establish good standing after a semester on warning;
2) to maintain an average of 1.7 in any term after a previous record of warning;
3) to achieve good standing after being on warning any two previous semesters;
4) two or more classes in one term or has a term average of 1.0 or below.

The Academic Standards and Scholarship Committee may decide to permit a student to remain on warning more than one semester if there has been significant improvement even though the cumulative average is still below 1.7.

S-U Grading Policy

An undergraduate may register to receive a final grade of S (Satisfactory) or U (Unsatisfactory) in courses that offer this option—either in the school or in other divisions of the university—subject to the following conditions:

1) the S-U option may be used in ILR and in out-of-college course electives only, not in directed studies;
2) students are limited to registering in *two* S-U courses a term;
3) S-U registration is limited to four credits for each course;
4) students registering for S-U grades must be in good standing;
5) students must fulfill the graduation requirement of 105 letter-graded credits.

ILR faculty members assign a grade of U for any grade below C– and a grade of S for any grade of C– or better. A grade of U is considered equal to an F in determining a student's academic standing, although it is not included in the cumulative average.

No change of grading (from letter to S-U or from S-U to letter) may be made after the first three weeks of class. There are no exceptions to this restriction, and appeals will not be accepted.

Grades of Incomplete

A grade of incomplete is assigned when the course has not been completed for reasons that are acceptable to the instructor. It is understood that the work will be completed later and credit given. Instructors may grant a

grade of incomplete for a limited number of clearly valid reasons, but only to students with substantial equity in a course. A firm and definite agreement on the conditions under which it may be made up must be made with the instructor. The school's policy allows a maximum of two full terms of residence for removal of a grade of incomplete. If it is not made up within this time, the grade automatically becomes an F.

SPECIAL ACADEMIC PROGRAMS

To meet the special academic objectives of some students, the school's faculty has established several special academic programs. For additional information, students should contact a counselor in the Office of Student Services. Counselors will explore the program with students to help them decide if it suits their interests.

Five-Year Master of Science Degree Program

With early planning it is possible to earn the M.S. degree in a fifth year of study. This program is designed specifically for those who wish concentrated study in an area of specialization in the school for a Master of Science degree. Students considering this program should consult a counselor in the Office of Student Services after their freshman year.

Internships

The Credit Internship Program has provided students with a vivid understanding of problems in labor and industrial relations through observation and participation in "real-life" labor problem solving. A number of selected students spend a term of their junior year in Albany, New York City, or Washington, D.C., in close contact with practitioners. Their activities include independent research under direction of ILR faculty members and seminars drawing on fieldwork experience with employers, labor organizations, and government agencies. More information about this program is available from the Office of Student Services.

Honors Program

Undergraduates who are ranked in the top 20 percent of their class at the end of the junior year may propose a two-semester research project, an honors thesis, for review by the Committee on Academic Standards and Scholarships. When approved, the candidate for graduation with honors works for two semesters (for three credits in each term) to research, write, and then defend the thesis.

Study Abroad

Cornell students with strong academic records and the necessary preparation in required and elective courses are encouraged to consider study abroad. The university currently has contact with universities in more than 40 countries that permit undergraduates to register for courses while maintaining Cornell registration and financial aid for a semester or a year. Information about those opportunities may be requested from Cornell Abroad, 474 Uris Hall.

Some study abroad programs require the development of language proficiency and preparation in appropriate courses at Cornell. Students should consult the Office of Student Services and Cornell Abroad in the freshman and sophomore years to be sure that they comply with the academic and procedural requirements for study abroad.

COLLECTIVE BARGAINING, LABOR LAW, AND LABOR HISTORY

N. Salvatore, chair; M. Cook, C. Daniel, I. DeVault, M. Gold, L. Gray, J. Gross, H. Katz, S. Kuruvilla, R. Lieberwitz, D. Lipsky, K. Stone, L. Turner

ILRCB 100 Introduction to U.S. Labor History: Nineteenth Century
Fall. 3 credits. C. Daniel, I. DeVault, N. Salvatore.
This first semster of a two-semester sequence covers the major changes in the nature of work, the workforce, and the institutions involved in industrial relations in the United States through the end of the nineteenth century.

ILRCB 101 Introduction to U.S. Labor History: The Twentieth Century
Spring. 3 credits. Prerequisite: ILRCB 100. C. Daniel, I. DeVault, N. Salvatore.
This second semester of a two-semester sequence covers the major changes in the nature of work, the workforce, and the institutions involved in industrial relations in the United States from the end of the nineteenth century up to the present.

ILRCB 201 Labor and Employment Law
Fall and one section in spring. 3 credits. M. Gold, J. Gross, R. Lieberwitz, K. Stone.
A survey and analysis of the law governing labor relations and employee rights in the workplace. The first half of the course examines the legal framework in which collective bargaining takes place, including union organizational campaigns, negotiations for and enforcement of collective bargaining agreements, and the use of economic pressure. The second half of the course surveys additional issues of rights in employment, including such topics as employment discrimination, the developing law of "unjust dismissal," and union democracy. Also serves as an introduction to judicial and administrative systems.

ILRCB 300 Collective Bargaining (200)
Fall and spring. 3 credits. M. Cook, H. Katz, S. Kuruvilla, L. Turner.
A comprehensive introduction to industrial relations and collective bargaining in the United States; the negotiation, scope, and day-to-day administration of contracts; the major substantive issues in bargaining, including their implication for public policy; industrial conflict; the major challenges facing unions and employers today; U.S. industrial relations in international and comparative perspective.

ILRCB 301 Labor Union Administration
Fall. 3 credits. Staff.
Study and analysis of the structure and operations of American unions, including the complicated internal life of the organizations; the varied environments in which unions develop and grow or decline; the relationship of national unions, local unions, and members in the many different sections of internal union government; the ways in which unions are set up to handle organizing, collective bargaining, contract administration, and political activity; and the widespread movement toward merger and consolidation of unions that began in the sixties and continues today. All of these involve a study of union constitutions and other primary documents, in addition to secondary readings. Attention is given to relevant legislation, current problems of unions, and the eternal problems of attaining union democracy.

ILRCB 302 Strangers and Citizens: Immigration and Labor in U.S. History
Fall or spring. 3 credits. I. DeVault.
This course explores immigrant workers' experiences in the nineteenth and twentieth centuries from different perspectives. Students examine what it meant to the immigrants themselves to arrive as strangers in the United States while also examining the ways in which pre-existing American groups defined these immigrants as "strangers." Similarly, students look at U.S. citizens in their roles as greeters of immigrants, detractors of immigrants, and as models for the aspirations of immigrants. Throughout the course our main examples come from the industrial and union realms.

ILRCB 304 Seminar in American Labor and Social History
Fall or spring. 4 credits. Permission of instructor. C. Daniel, I. DeVault, N. Salvatore.
An undergraduate seminar whose topic changes depending on semester and instructor.

ILRCB 305 Introduction to Labor Arbitration and Alternative Dispute Resolution
Fall. 3 credits. J. Gross.
An introductory survey that focuses on the U.S. labor arbitration process in the private and public sectors (legal issues, discipline and discharge, contract language interpretation, remedies, and procedures), and on alternative dispute resolution systems in the United States and other countries. Student participation in class discussion is expected and assignments include an original research paper.

ILRCB 384 Women and Unions (also WOMNS 384)
Fall or spring. 4 credits. I. DeVault.
This course explores women's participation in the United States labor movement in the nineteenth and twentieth centuries. Issues covered include women workers' relations with male-dominated union movements, the role of cross-class alliances of women in organizing women workers, interactions with radical parties and organizations, problems faced by women union leaders and activities, and others.

ILRCB 385 The African-American Workers, 1865–1910: The Rural and Urban Experience
Spring. 3 credits. Prerequisites: junior or senior or permission of instructor. N. Salvatore.
Examines the history of blacks in America from Emancipation through the experience of the first generation born after slavery, with a focus on the work experience. Topics include the restructuring of work during Reconstruction; the relationship between work and black organizational developments; between black and white workers; and the nature of work in the agricultural south and in cities throughout the nation.

ILRCB 386 The African-American Workers, 1910–the Present: Race, Work, and the City

Fall. 3 credits. Prerequisites: junior or senior. N. Salvatore.

Examines the history of blacks in America from the start of the Great Migration through the 1970s, with a focus on the work experience. Topics include the effect of migration and urbanization on black workers; the nature of the relationship between black and white workers as influenced by the depression and the two world wars; and an examination of the effect of the Civil Rights movement on the economic circumstances of black workers.

ILRCB 400 Union Organizing

Spring. 3 credits. Prerequisites: undergraduates, ILRCB 201 and 300; graduate students, ILRCB 500 and 501. K. Bronfenbrenner.

Explores various aspects of unions' attempts to organize workers: including why some workers join unions and others do not; strategy and tactics implemented by unions and management during organizing campaigns; present status of labor law as it affects organizing; creative approaches to union organizing; and the organizing model of unionism.

ILRCB 401 My Brother's Keeper: Volunteerism and Philanthropy

Spring. 3 credits. Prerequisites: junior or senior or permission of instructor. M. Gold.

The philosophy, practice, economics, and law of volunteering labor and donating money. Topics include: altruism versus self interest; why individuals volunteer labor and raise and donate money; the structure and practices of charitable organizations; the economic effects of voluntary labor and philanthropic gifts; and the law of raising and distributing money.

ILRCB 404 Contract Administration

Fall. 3 credits. Prerequisites: ILRCB 300 and 201 or ILRCB 500 and 501. K. Bronfenbrenner.

This course focuses on the practice, nature, and challenges of union representation under collective bargaining agreements. Working with union contracts, constitutions, and by-laws from a diversity of national and local public and private sector agreements, the course examines how U.S. unions represent their members in different industries and different collective bargaining environments. Issues addressed include union representative/steward rights and responsibilities, contract enforcement structures and practice, access to information, new work systems, hours of work and scheduling, contingent staffing arrangements, workplace discrimination, health and safety, promotional opportunities, down-sizing, leadership development, membership involvement and commitment, internal organizing, community coalition building, and decertification campaigns. Students practice hands-on work in interpreting contract language and preparing and presenting grievances and unfair labor practices.

ILRCB 405 Negotiation and Dispute Resolution

Fall and spring. 3 credits. Prerequisites: background in economics and the social sciences, or permission of instructor. D. Lipsky, R. Seeber.

Course deals with three related topics: (1) the theory and practice of negotiation and bargaining, particularly between groups and organizations, with a focus on process, power, and procedures; (2) third-party dispute resolution, with a focus on mediation and arbitration; and (3) alternative dispute resolution (ADR), with a focus on its current use in the corporate sector and in employment disputes. Course also covers the implications of using ADR for our system of justice. ILRCB 405 is a generic dispute resolution course. Focus is not on labor relations or collective bargaining or on any particular class of disputes, but rather the course deals with the use of conflict resolution techniques in a variety of settings. The first half of the course emphasizes conceptual and theoretical principles useful in understanding negotiations. The second half of the course concentrates on the use of third parties in resolving disputes, especially arbitrators and mediators. The course uses simulations and mock bargaining exercises to illustrate theoretical and practical principles and to provide students with opportunities to gain insight and experience in negotiations and dispute resolution.

ILRCB 407 Contemporary Trade Union Movement

Spring. 3 credits. Prerequisites: undergraduates, ILRCB 100, 101; graduate students ILRCB 502. R. Seeber, R. Hurd.

An examination of contemporary trade union issues, including union power, political action, collective bargaining approaches, and organizing efforts. The course covers structural, functional, and strategic aspects of contemporary unions. Speakers from the union movement will address the class.

ILRCB 482 Ethics at Work

Fall or spring. 3 credits. Prerequisites: junior or senior or permission of instructor. M. Gold.

Major theories of ethics are examined, then applied to issues in the employment relationship such as genetic screening of job applicants, random drug testing of employees, affirmative action, discipline for off-duty conduct, whistle-blowing, worker safety and cost/benefit analysis, comparable worth, strikes by employees providing crucial services, and crossing a picket line.

ILRCB 488 Liberty and Justice for All

Fall or spring. 3 credits. Prerequisite: junior or senior or permission of instructor. M. Gold.

Major theories of ethics are examined, then applied to contemporary issues such as affirmative action and reverse discrimination, the right to life (from abortion to capital punishment), comparable worth, and constitutional rights such as freedom of speech.

ILRCB 495 Honors Program

Fall and spring (yearlong course). 3 credits each term. Admission to the ILR senior honors program may be obtained under the following circumstances: (a) students must be in the upper 20 percent of their class at the end of their junior year; (b) an honors project, entailing research leading to completion of a thesis, must be proposed to an ILR faculty member who agrees to act as thesis supervisor; and (c) the project, endorsed by the proposed faculty sponsor, is submitted to the Committee on Academic Standards and Scholarships.

Accepted students embark on a two-semester sequence. The first semester consists of determining a research design, familiarization with germane scholarly literature, and preliminary data collection. The second semester involves completion of the data collection and preparation of the honors thesis. At the end of the second semester, the candidate is examined orally on the completed thesis by a committee consisting of the thesis supervisor, a second faculty member designated by the appropriate department chair, and a representative of the Academic Standards and Scholarship Committee.

ILRCB 497–498 Internship

Fall and spring. 497, 3 credits; 498, 6 credits. Staff.

All requests for permission to register for an internship must be approved by the faculty member who will supervise the project and the chairman of the faculty member's academic department before submission for approval by the director of Off-Campus Credit Programs. Upon approval of the internship, the Office of Student Services will register each student for 497, for 3 credits graded A+ to F for individual research, and for 498, for 6 credits graded S-U, for completion of a professionally appropriate learning experience, which is graded by the faculty sponsor.

ILRCB 499 Directed Studies

Fall and spring. 3 credits.

For individual or group research projects conducted under the direction of a member of the ILR faculty, in a special area of labor relations not covered by regular course offerings. Sophomores, juniors and seniors with a preceding semester of 3.0 term average, are eligible to submit projects for approval by the Academic Standards Committee. Students should consult with a counselor in the Office of Student Services at the time of CoursEnroll in order to arrange for formal submission of their Directed Study.

ILRCB 500 Collective Bargaining

Fall. 3 credits. Open only to graduate students. Recommended: ILRCB 501 taken previously or concurrently. M. Cook, H. Katz, S. Kuruvilla, L. Turner.

A comprehensive introduction to the industrial relations system of the United States. The negotiation, scope, and day-to-day administration of contracts; union and employer bargaining structures; implications of industrial relations issues for U.S. competitiveness and public policy; industrial conflict; and U.S. industrial relations in international and comparative perspective.

ILRCB 501 Labor and Employment Law

Fall. 3 credits. Open only to graduate students. M. Gold, R. Lieberwitz, K. Stone.

A survey and analysis of the law governing labor relations and employee rights in the workplace. The first half of the course examines the legal framework in which collective bargaining takes place, including union organizational campaigns, negotiations for and enforcement of collective bargaining agreements, and the use of economic pressure. The second half of the course surveys additional issues of rights in employment, including such topics as employment discrimination, the developing law of "unjust dismissal," and union democracy. Also serves as an introduction to judicial and administrative systems.

ILRCB 502 History of Industrial Relations in the United States since 1865
Spring. 3 credits. Open only to graduate students. C. Daniel, I. DeVault, N. Salvatore.
This introductory survey course emphasizes historical developments in the twentieth century. Special studies include labor union struggles over organizational alternatives and such other topics as industrial conflicts, working-class life styles, radicalism, welfare capitalism, union democracy, and the expanding authority of the federal government.

ILRCB 504 The U.S. Industrial Relations System
4 credits. Offered only in New York City for the M.P.S. Program. Staff.
Examines the development, operation, and outcomes of the U.S. industrial relations system in a comparative context. Specifically, the course contrasts the American experience with industrial relations institutions and outcomes with the experience of several other countries in Europe and Asia. Students look at the process of union formation, the practice of collective bargaining at different levels, the methods of dispute resolution, and the legal regime germane to industrial relations. The course also focuses on both processes and outcomes of different country systems, focusing on the degree of collaboration or conflict, wage levels and wage inequality, and practices in different industries and firms. Finally the role played by industrial relations and human resource policy in economic and social development in these nations is addressed.

ILRCB 602 Arbitration
Fall and spring. 4 credits. Limited to 21 students. Prerequisites: undergraduates, ILRCB 201, 300; graduate students, ILRCB 500 and 501; permission of instructor. J. Gross, R. Lieberwitz.
A study of the place and function of arbitration in the field of labor-management relations, including an analysis of principles and practices, the law of arbitration, the handling of materials in briefs or oral presentation, the conduct of a mock arbitration hearing, and the preparation of arbitration opinions and post-hearing briefs.

ILRCB 603 The Economics of Collective Bargaining in Sports
Fall or spring. 3 credits. L. Kahn.
Surveys economic and industrial issues in the sports industry. Topics include: salary determination, including free agency, salary caps, salary arbitration; competitive balance and financial health of sports leagues; antitrust issues in sports; labor disputes, union history, and contract administration issues in sports leagues; discrimination in sports; and performance incentives.

ILRCB 604 Theories of Equality and Their Application in the Workplace
Fall or spring. 3 credits. R. Lieberwitz.
An examination of the various aspects of equality in the workplace, focusing on issues of race, gender, and national origin, and the ways in which societal discrimination on these bases are institutionalized in the workplace. Theories attempting to define "equality" and specific workplace issues are studied, including the means for achieving equality at the workplace. The course entails a high level of student participation in class discussions, and assignments include a research paper.

ILRCB 605 Readings in the History of Industrial Relations in the United States
Fall. 3 credits. Limited to seniors and graduate students. C. Daniel, N. Salvatore.
An intensive seminar covering original printed sources and scholarly accounts for different periods in American history.

ILRCB 606 Theories of Industrial Relations Systems
Fall or spring. 3 credits. Limited to seniors and graduate students. Prerequisites: seniors, ILRCB 100, 101, 300; graduate students, ILRCB 500. H. Katz.
This course traces the evolution of theory and research on industrial relations. Topics include: theories of the labor movement; institutional models and evidence regarding what unions do; the origins of internal labor markets and their relationship with unionization; models of strikes; empirical assessments of arbitration; research on union decline; and empirical evidence of the impacts of new technology.

ILRCB 607 Values in Law, Economics, and Industrial Relations
Fall and spring. 3 credits. Limited to 21 students. Prerequisites: ILRCB 201, 300, 500, 501. J. Gross.
An examination of the often hidden values and assumptions that underlie the contemporary U.S. systems of employment law, work and business, and industrial relations. Classroom discussions and student research projects use novels and short stories (as well as the literature of industrial and labor relations) to focus on issues such as: discrimination; law, economics, and the state; work and business; power, conflict, and protest; and rights and justice.

ILRCB 608 Special Topics in Collective Bargaining, Labor Law and Labor History
Fall. 3 credits. Prerequisites: ILRCB 201 or 501 or permission of instructor. M. Lieberwitz
Lec 03—An advanced labor law course which builds on the foundation of the study of labor law in the required labor and employment law course. The course is an in-depth study of labor law, with particular focus on the National Labor Relations Act, including issues of organizing across different occupational groups, collective bargaining, strikes, picketing, and contract enforcement. The course also includes a study of legal issues of union democracy and other labor and employment law issues.

ILRCB 608 Collective Bargaining Simulation
Fall. 3 credits. Open only to juniors, seniors, and graduate students. Limited to 14 students. One evening extended bargaining session is required. H. Kramer.
Lec 04—After a brief introduction to negotiations techniques, participants take part in a simulated negotiation, set in a hypothetical company and union environment (for 2001 in the chemicals industry), for a moderately sized bargaining unit, either as members of a management or a union team. The course stresses the process of negotiations over their outcome. Negotiation problems are highly realistic, with attention given to dynamic legal, economic, political, and communication concerns. Participants plan for negotiations, cost proposals, negotiate contract language, and bargain wages, benefits, and other economic items, in the context of a company and union with an established contract, history, policies, and culture (which are supplied by the course leaders). Students are required to read, "Game, Set, Match—Winning the Negotiations Game," but the primary thrust is on using practical methods for managing the negotiation process. **This is a participation based hands-on course**. Students wishing merely to observe should *not* take this program. There is a group planning paper requirement. This course is recommended for graduate and undergraduate students who have taken or who are taking collective bargaining and labor law. Participants are required to adhere to high standards for "completed staff work."

ILRCB 609 Special Topics: Labor Law Policy Seminar
Spring. 3 credits. K. Stone.
The United States' collective bargaining system, which had its origins during the New Deal period, has come under intense attack. The intellectual premises of the system have been challenged by scholars on both the right and the left, and at the same time the decline in the labor movement has undermined its political support. This seminar looks at the theoretical attacks on the New Deal collective bargaining system and at some of the current proposals for its replacement. Among the topics to be discussed are: the theory of regulation embodied in the National Labor Relations Act and its critique; alternative concepts of labor markets and their policy ramifications; the emergence of the global economy and its ramifications for domestic labor regulation. There are also discussions of alternative systems of labor regulation, such as is found in West Germany, Sweden, and Japan.

ILRCB 650 Service Work and Workers in Historical Perspective
Fall or spring. 3 credits. I. DeVault.
Takes a historical perspective on the development of a service economy in the United States. Readings include general and theoretical works, but the main focus is recent historical scholarship on specific occupations and situations in the "nonproductive" workforce. Students explore primary sources for research on the subject and write research papers.

ILRCB 651 Industrial Relations in Transition
Spring. 3 credits. Limited to seniors and graduate students. H. Katz.
Considers whether recent developments such as concession bargaining, worker participation programs, and the growth of nonunion firms represent a fundamental transformation in industrial relations practice. Reviews recent research and new theories arguing that such a transformation is occurring, including the work of Piore and Sabel, Bluestone and Harrison, and Kochan, McKersie, and Katz. Also reviews the counterarguments and evidence put forth by those who believe no such transformation is under way. Course material focuses on industrial relations practice in the private sector in the United States, although some attention is paid to developments in Western Europe, the United Kingdom, and Japan.

ILRCB 655 Employment Law I
Fall. 3 credits. Prerequisites: ILRCB 201, 501, or permission of instructor. Classroom presence and participation are mandatory.

This course can be taken either before or after ILRCB 656. There are considerable reading responsibilities. L. Adler.

The approach taken is similar to ILRCB 656, but the subject matter differs. The subject studied include employment at will and its exceptions; the role of the Constitution in the US workplace; the law of electronic and traditional privacy at work; and the slowly evolving rights of contingent workers in the old and new economies. One study primarily reviews federal and state court decisions and focuses upon the way that employees' rights are advanced or constricted by law.

ILRCB 656 Employment Law II

Spring. 3 credits. Prerequisites: ILRCB 201, 501, or permission of the instructor. Classroom presence and participation are mandatory. This course can be taken either before or after ILRCB 655. L. Adler.

The approach taken is similar to ILRCB 655, but the subject matter differs. The areas covered include the meaning and validity of pre-employment arbitration agreements; the critical distinctions in the status and thus the rights of employees, independent contractors, and contingent workers; what rights the working poor, the homeless, and workfare individuals have on the "job;" and the origin and application of the workers compensation laws that apply when people are injured or contract disease from their work. One study primarily reviews federal and state court decisions and focuses upon the way that employees' rights are advanced or constricted by the law. There are considerable reading responsibilities.

ILRCB 682 Seminar in Labor Relations Law and Legislation

Fall or spring. 3 credits. Limited enrollment. Prerequisite: permission of instructor. R. Lieberwitz.

This course covers legal problems in public employment and other areas of labor relations affecting the public interest.

ILRCB 683 Research Seminar in the History of Industrial Relations

Fall or spring. 3 credits. Prerequisites: undergraduates, ILRCB 100 and 101; graduate students, ILRCB 502. C. Daniel, I. DeVault, N. Salvatore.

Areas of study are determined each semester by the instructor offering the seminar.

ILRCB 684 Employment Discrimination and the Law

Fall or spring. 3 credits. Prerequisite: ILRCB 201/501 or equivalent. M. Gold, R. Lieberwitz.

An examination of the laws against employment discrimination based on race, color, religion, sex, national origin, age, and disability.

ILRCB 685 Research Seminar on Trade Unions

Fall or spring. 3 credits. Prerequisite: ILRCB 300 or 500; permission of instructor. S. Kuruvilla.

Designed to provide an analytical survey of research on trade unions in the United States. Major topics include unions in politics, unions as complex organizations, public opinion and attitudes toward unions, determinants of union growth and decline, economic and noneconomic effects of unions, internal union government, and commitment and participation in trade union activity. This is a research-oriented course.

ILRCB 686 Collective Bargaining in the Public Sector

Fall or spring. 3 credits. Prerequisites: undergraduates, ILRCB 300 and 201; graduate students, ILRCB 500 and 501. Staff.

An examination of the development, practice, and extent of collective bargaining between federal, state, and local governments and their employees. The variety of legislative approaches to such matters as representation rights, unfair practices, scope of bargaining, impasse procedures, and the strike against government are considered along with implications of collective bargaining for public policy and its formulation.

ILRCB 689 Constitutional Aspects of Labor Law

Fall or spring. 3 credits. R. Lieberwitz.

In-depth analysis of the Supreme Court decisions that interpret the United States Constitution as it applies in the workplace. This study focuses on the First Amendment, Fifth Amendment, Fourteenth Amendment, and Commerce Clause, with issues including freedom of speech and association, equal protection, due process, and other issues in the area of political and civil rights. The course entails a high level of student participation in class discussion, and assignments include a research paper.

ILRCB 703 Theory and Research in Collective Bargaining

Spring. 3 credits. Open to graduate students who have taken ILRCB 500 and ILROB 723 or their equivalents. Recommended: a statistics course beyond the level of ILRST 510. Staff.

This is a second-level course in collective bargaining that builds on the institutional research covered in ILRCB 500. The existing literature in the area of collective bargaining is appraised for its theoretical and empirical content. Efforts are made to explore the appropriate role for theory and empirical analysis in moving research in collective bargaining toward a more analytical perspective, and to identify and appraise the underlying paradigms used to study collective bargaining-related issues.

ILRCB 705 The Economics of Collective Bargaining

Spring. 3 credits. Prerequisites: ILRCB 500; ILRLE 540 (or their equivalents) and an understanding of multiple regression analysis; or permission of instructor. Staff.

Focuses on both the economic analysis of unions and collective bargaining in our economy and on the economic forces that affect collective bargaining. The method is to identify and conceptualize the structural determinants of relative bargaining power. On this basis, the course examines both the economic outcomes of collective bargaining and current bargaining trends in a variety of industries. Tentative theoretical analyses of unionism (neoclassical, institutionalist) are compared. The statistical techniques and empirical results of research on the union effect on economic outcomes (wages, prices, inflation, profits, productibility, earnings inequality) are also evaluated. The effect of technology, corporate structures, and public policy on union bargaining power is outlined, and a number of case studies of collective bargaining in the private sector are reviewed. A term paper is required.

ILRCB 708 Negotiations in Practice (also LAW 672)

Fall. 3 credits. S. Kuruvilla.

This course aims to provide opportunities for class participants to develop their negotiating abilities for use in organizational and other settings. The course is premised on the assumption that negotiating concepts are best learned through practice which is grounded in rigorous analysis and reflection. While theoretical principles and concepts from various reference disciplines (such as social psychology, sociology, and economics) are presented through lectures and readings, this course focuses primarily on improving practical skills. Class participants not only learn to enhance their individual abilities in dyadic and group situations, but also learn to analyze contexts for the most effective application of these skills.

ILRCB 783 Seminar in American Labor History (also HIST 683)

3 credits. Graduate students only. Permission of instructor required. A research paper is required. N. Salvatore.

This course explores the relationship of scholarly biographical writing to the field of American social history. More and more historical biographies look to incorporate social analyses at the center of their biographical structures. Students read, discuss, and analyze the varied strengths and weaknesses of a number of these efforts. The author's understanding of the play between biographical subject and the larger social context, and its meaning for the structure of the book, are a point of inquiry that encourage numerous approaches and interpretations.

ILRCB 790 ILR M.P.S. Program

Fall and spring. 1–9 credits. Staff.

Supervised research only for those enrolled in the ILR M.P.S. program.

ILRCB 798 Internship

Fall and spring. 1–3 credits.

Designed to grant credit for individual research under direction of a faculty member by graduate students who have been selected for an internship. All requests for permission to register for ILRCB 798 must be approved by the faculty member who will supervise the project.

ILRCB 799 Directed Studies

Fall and spring. Credit TBA.

For individual research conducted under the direction of a member of the faculty.

ILRCB 980 Workshop in Collective Bargaining, Labor Law, and Labor History

Fall and spring. 2 credits. Limited to M.S. and Ph.D. candidates in the department. S-U grades only. Staff.

Designed to provide a forum for the presentation of current research being undertaken by faculty members and graduate students in the Department of Collective Bargaining, Labor Law, and Labor History, and by invited guests. All M.S. and Ph.D. candidates in the department who are at work on their theses are strongly urged to enroll. Each student in the course is expected to make at least one presentation during the year, focusing on the formulation, design, execution, and results of that student's thesis research.

HUMAN RESOURCE STUDIES

P. Wright, chair; R. Batt, J. Bishop, J. Boudreau, V. Briggs, M. Cavanaugh, C. Collins, L. Dyer, G. Milkovich, Q. Roberson, W. Wasmuth

ILRHR 260 Human Resource Management
Fall. 3 credits. Open only to ILR students; others by permission. Q. Roberson.
An overview of the management of human resources in organizations. Topics include human resource decisions dealing with staffing, training and development, performance management, compensation, and employee relations. Emphasis is on: problem-solving and decision-making approaches; operational methods, technologies, and practices; application of relevant behavioral science theory and research; and legislation and other environmental constraints having an important bearing on the effective utilization of human resources by an enterprise.

ILRHR 266 Personal Computer Basics
Fall, spring, and summer. 2 credits. Limited. C. Homrighouse.
Provides basic skills in the use of personal computers using the Windows environment. Course covers the basics of Lexis Nexis, Windows, Microsoft Excel, Access, and Powerpoint. Emphasis is placed on hands-on experience using examples demonstrating human resource issues and PC-based solutions. This course is a prerequisite to several advanced Human Resource Management electives.

ILRHR 360 Human Resource Economics and Public Policy
Fall and spring. 3 credits. Open to sophomores, juniors, and seniors. V. Briggs, J. Bishop.
A review of labor-market trends, data collection systems, and theories pertaining to public efforts to develop the employment potential of the nation's human resources and to combat unemployment. The major segments of the nation's educational training enterprise (e.g. public education, higher education, employer-provided training, apprenticeship, and special training programs for the economically disadvantaged) are examined. The course examines programmatic issues pertaining to such groups as youth and disabled rural workers. It also covers public policies pertaining to welfare reform, direct job creation, worker relocation, economic development, targeted tax credits, and "empowerment zone" proposals. Comparisons are made with other industrialized nations.

ILRHR 362 Career Development: Theory and Practice
Fall, spring. 2 credits. 7 weeks. Limited to 30. S-U only. J. McPherson.
This course covers the components of career management, individual factors and organizational realities in the development of both careers and organized programs for career management. Two complementary learning tasks are required, information-gathering for career decision making based on self-assessment activities, and comprehension of organizational circumstances and practices encountered as careers develop. Grades are based on short writing assignments and a research paper.

ILRHR 363 Leadership Seminar for Fraternities and Sororities
Spring. 2 credits. S-U only. Permission of instructor. Staff.
Provides students with an opportunity to develop their leadership and management skills. The philosophy of the class is that fraternity and sorority houses are small businesses and the leadership must be capable of effective managing and leading in order for them to succeed. The learning method are "hands on" with participants working on weekly assignments that involve the application of lessons learned to their current job duties. Students participate in role plays, class discussions, meetings with guest speakers, and debriefing sessions where they report the results of using the material obtained from class in their current situations.

ILRHR 366 Women at Work
Spring. 3 or 4 credits. Prerequisite: ILRHR 260 or equivalent. J. Farley.
This course covers various aspects of female occupational roles in twentieth-century United States. Historical, social, and legal factors that influence women's choice of careers, work socialization and training, and subsequent labor-market experience are considered. Working women's entry-level jobs, opportunities for advancement, and income are compared to men's.

ILRHR 456 International Human Resource Management
Fall. 3 credits. Staff.
Provides an examination of international human resource management issues in multinational enterprises. The course has two major objectives: to enhance understanding of key strategic and functional issues related to IHRM, and to develop analysis of practical IHRM issues in multinational enterprises. Includes topics such as strategic issues for IHRM, cross-cultural management issues, coordination issues, and expatriate management.

ILRHR 460 Human Resource Strategies for Entrepreneurial Firms
Spring. 3 credits. Open to juniors and seniors. Prerequisites: ILR 260 or permission of instructor. C. Collins.
Explores the human resource problems and solutions specific to start-up firms and growing entrepreneurial organizations. Over the course of the semester, students integrate their knowledge of the functional areas of human resource management with general management, business strategy, entrepreneurship, accounting/finance, marketing, public relations, and small business management. Course material and creative solutions to problems are communicated to the class through lectures, case studies, class and group discussions, and formal presentations. The emphasis for the course is on the integration of concepts, application to real-life business situations, and the acquisition of general management skills and knowledge.

[ILRHR 461 The Design of Work Systems: Comparative and Interdisciplinary Perspectives
Fall or spring. 3 credits. Prerequisite: ILR 260 or equivalent and consent of instructor. Limited to juniors and seniors. Not offered 2001–2002. R. Batt.
Seminar designed to explore the state of knowledge and current research concerning the design and development of alternative work systems. The focus is on understanding alternative approaches to work restructuring and their differential effects on firm competitiveness and employee welfare. The first half of the course considers classic texts on mass production, flexible specialization, sociotechnical systems, diversified quality production, and lean production. It compares these workplace models in their original national contexts and in subsequent transplants. Relevant research from economics, engineering, organizational behavior, human resources, and industrial relations is examined. The second half of the course considers these alternative approaches to restructuring in the context of specific manufacturing and service industries and occupational groups. Students are required to hand in weekly memos covering the readings, actively participate in seminar discussions, and write two research papers on topics relevant to the course.]

ILRHR 462 Staffing, Training, and Development
Spring. 3 credits. Prerequisites: ILRHR 260 or permission of the instructor. C. Collins.
This course provides overviews of the staffing, training, and development functions in organizations. The first half of the semester focuses on the process by which organizations fill positions. Topics include legal issues, job/competency analysis and planning, external selection practices, and internal staffing decisions. The second half of the semester focuses on the process by which organizations train and develop employees. Topics include training needs assessment, program design, training evaluation, and management development practices. Throughout the semester students examine the relationship between the staffing and training/development functions.

ILRHR 463 Employee Relations and Diversity
Fall. 3 credits. Q. Roberson.
Explores the policies, programs and practices used by employers to promote the fair treatment of employees, especially those not covered by collective bargaining contracts. Includes such policies as organizational justice and the protection of employee rights of such programs as work/life balance, and worker health and safety; and elements of such practices as employee communication and conflict resolution. Also examines individual and organization climate factors that are important to the management of diversity in business organizations. Considers variations in employee relations and diversity management practices and the effects of these practices on relevant individual and organization outcomes.

ILRHR 464 Business Strategy
Fall. 3 credits. C. Collins.
Intended to be an integrative course focusing on strategic management. The main purpose of the course is to provide an opportunity for students to study and analyze issues associated with strategic thinking in complex business situations, top management decision making, and the functions of corporations as a whole. Allows students to bring together all of the functional skills they have learned in other business or related classes (e.g., marketing, accounting, finance, human resources, etc.) and to apply this knowledge to business problems faced by top management in existing organizations. Class is comprised of both a lecture and case study format.

[ILRHR 466 Comparative Human Resource Management

Fall. 3 credits. Not offered 2001–2002. Staff.
Provides a survey of human resource management practices in two key regions: Europe and the Asia-Pacific region. Focus of this course is on HRM issues such as selection and staffing, training and development, and appraisal and reward systems. Special attention is given to HRM trends and developments. Issues of transferability of HRM practices, and implications for multinational enterprises operating in those regions, is also discussed.]

ILRHR 468 Human Resources Management Simulation

Spring. 2 credits. Limited to 30 juniors and seniors. Prerequisite: ILRHR 260 or equivalent. 7 weeks. W. Wasmuth.
Uses a simulation model and an open-systems approach as means to enhance students' skills in strategic planning and managerial decision making. Attention is given to the implications and efforts of strategic human resource managerial and supervisory decisions as measured by 10 organizational performance indicators, including quality of work life, employee productivity, customer satisfaction, employee retention, internal control, and the bottom line. Each student is assigned to a group (team) of five members and must be committed to the work of that group. An individual research paper is also required. Regular attendance is required.

ILRHR 469 Immigration and the American Labor Force

Fall and spring. 3 credits. V. Briggs.
Assesses the role that immigration policy plays as an instrument of human resource development in the United States. Immigration policy will be placed in an evolutionary context but primary attention will be given to the post-1965 revival of mass immigration. In addition to legal immigration, policies pertaining to illegal immigration, border commuters, "maquiladoras," refugees, asylees, and nonimmigrant workers are also examined. Comparisons are also made with immigration systems of other nations.

ILRHR 495 Honors Program

Fall and spring (yearlong course). 3 credits each term.
For description, see the section on Collective Bargaining, Labor Law, and Labor History.

ILRHR 497–498 Internship

Fall and spring. 3 and 6 credits.
For description, see the section on Collective Bargaining, Labor Law, and Labor History.

ILRHR 499 Directed Studies

For description, see the section on Collective Bargaining, Labor Law, and Labor History.

ILRHR 560 Human Resource Management

Fall and spring. 3 credits. Open to graduate students only. Q. Roberson.
A survey course covering the major areas of the management of human behavior in work organizations. Consideration is given to aspects of strategic human resource management such as: staffing, training and development, performance management, compensation, and employee relations. Emphasis is on exploring these issues from both strategic tactical levels to increase organizational effectiveness.

ILRHR 564 Human Resources Management in Effective Organizations

Fall or spring. 4 credits. Offered only in New York City for the M.P.S. Program. Staff.
This course offers the opportunity to become better prepared to make effective decisions about human resources. Successful organizations depend on people; their human resources. The first module examines strategic human resource management and the effects of HR decisions on organization success and fair treatment of people. The second module focuses on alternative systems used to staff and develop people. The third module focuses on compensating and rewarding people. The final module includes employee relations and alternative work systems. Case and field studies are used throughout the course.

ILRHR 650 Advanced Desktop Applications

Spring. 1 credit. Letter grade only. Prerequisite: ILRHR 266 or significant experience (2–4 years) using office applications. C. Homrighouse.
Explores advanced topics for common desktop applications including Windows, Word, Excel, Access, PowerPoint, and basic HTML. The course is designed based on student input and instructor recommendations, covering those subjects that students feel would be most useful and relevant in the job market. Examples of areas include working with tables, columns or sections in Word, pivot tables in Excel, taking a PowerPoint presentation "on the road" and using join tables to create relationships in Access.

ILRHR 653 Research on Education Reform and Human Resource Policy

Spring. 3 credits. J. Bishop.
State and local efforts to improve K–12 education are employing a variety of (sometimes contradictory) reform strategies. A research seminar that will critically examine the case that is made for (and against) each of the major reform proposals and review studies that provide objective evidence on their effectiveness. The education reform strategies that will be examined include: vouchers, charter schools, site-based decision making by teachers and parents, smaller classes, direct instruction versus discovery learning, extending the school day and year, better preparation and selection of new teachers, better professional development, ending tenure, merit pay, state standards and school accountability, ending social promotion, and externally set end-of-course examinations.

ILRHR 661 Applied Personal and Organization Development

Spring. 3 credits. Seniors and graduate students. C. Warzinski.
An experiential course that deals with OD and its role in the organizational change process. Combines the opportunity for hands-on practice in a workshop setting. Students are responsible for researching and writing a paper that examines a specific method, technique, or critical issue; preparing an in-class demonstration/presentation illustrating applications of a chosen subject; and completing a final project requiring a comprehensive proposal that describes an appropriate and logically supported intervention strategy.

ILRHR 662 People in Agile Organizations

Fall. 4 credits. Prerequisites: ILRHR 260, 560, or equivalent, plus two functional courses in HR management. Enrollment limit, 25. L. Dyer.
Organizational agility is defined as the capacity to be infinitely adaptable without having to change. It is a core competence for organizations operating in rapidly moving marketplaces. Accordingly, an increasing number of organizations are striving to become more agile by inventing new ways of managing all aspects of organizational capability. This course explores the opportunities and challenges posed by organizational agility, with particular emphasis on crafting human resource strategies that support this evolving paradigm. Every effort is made to run the course as an agile organization rather than using a traditional classroom format.

ILRHR 664 "e-HR: Human Resource Management and the WEB in The Information Age"

Fall. 3 credits. J. Boudreau, S. Basefsky.
Designed to teach students skill-based techniques in HR research methodology. Students are taught to act as their own consultants in both a classroom and workforce setting as they access data and find statistical information to support their research topics. The first five weeks of the semester consist of weekly meetings with the reference librarians at the Martin P. Catherwood Library. These meetings cover a different research technique each week, and students are given readings and a hands-on assignment to gain practical experience on these techniques.

ILRHR 665 Business Strategy and Human Resources

Fall. 4 credits. Limited. Prerequisite: ILRHR 260/560 plus 3 other courses in human resource studies and permission of instructor. P. Wright.
As the capstone course in HR studies, students integrate the theories and practices learned in other courses, to explore the linkages between business strategy and HRM. Extensive fieldwork is involved. The field projects are designed to make students explore and understand business strategy and draw upon and integrate their course work in HR planning, staffing, development, compensation and regard, and new work systems.

ILRHR 666 Strategic HR Metrics

Fall. 4 credits. Prerequisites: ILRHR 260/560 or equivalent, on course in statistics, one elective in human resource studies. J. Boudreau.
Explores how to account for the contribution of human resource management programs and decisions to achieving organizational goals. This course emphasizes a systematic decision-making system that organizes the discipline of human resource management and can assist in planning and evaluating programs. Topics include the role of financial-accounting statements in managing human resources, cost-benefit analysis for programs, managing human resources as a profit center, and identifying human resource management constituents to address their goals.

ILRHR 667 Employee Relations and Diversity

Spring. 4 credits. Prerequisites: ILRHR 260/560 or equivalent and permission of instructor. Q. Roberson.
Explores the policies, programs, and practices used by employers to promote the just and

humane treatment of employees, especially employees not covered by collective bargaining contracts. Includes such policies as organizational justice and the protection of employee rights; such programs as work/life balance, worker health and safety; and elements of such practices as employee communication and conflict resolution. Also examines individual and organizational climate factors that are important to the management of diversity in business organizations. Considers: variations in employee relations; diversity management practices; the motives of employers in implementing such practices; and strategies for leveraging these practices to increase organization effectiveness.

ILRHR 668 Staffing Organizations
Spring. 3 credits. Prerequisites: ILRHR 260/560 and one course in statistics or permission of instructor. C. Collins.
Seminar providing an overview of the processes by which organizations staff positions with both internal and external applicants. Because staffing is one of the primary human resource activities, it is critical for human resource professionals to understand how theory, research, and legal foundations can inform staffing decisions. Therefore, this course focuses on theories, research, policies, and practices concerning job recruitment and selection. Topics covered include staffing strategy and context, measurement of staffing effectiveness, job/competency analysis, human resource planning, recruitment and job choice, and internal and external selection practices.

[ILRHR 669 Managing Compensation
Fall. 4 credits. Limited to 30 students. Prerequisites: ILRHR 260/560 or equivalent, ILRHR 266 and basic statistics or permission of instructor. Not offered 2001. G. Milkovich.
Focuses on managing employee compensation in contemporary organizations. The major objectives are: to examine the current state of compensation decision making, to examine how recent theoretical and research developments inform compensation decisions, and to offer an opportunity to develop competencies in making compensation decisions.]

ILRHR 670 Seminar in Manufacturing
Spring. 15 credits. R. Batt.
Semester in Manufacturing ("SiM") is designed to give students a basic understanding of the fundamentals of manufacturing, as well as a broad overview of current issues and trends. The 15-credit immersion format allows development of the linkage of manufacturing to other functions in the enterprise (research and development, marketing, corporate strategy, human resources, etc.). A highlight of SiM is that each student visits more than 20 manufacturing facilities during the semester, representing diverse sets of products, processes, and manufacturing strategies. These visits include extended discussion sessions with management, and often union representatives, as well as a factory tour. Visits bring the "real-world" perspective to the course. SiM is built around five basic themes. The 15-credit immersion format allows each theme to be discussed in depth, and the interrelationships between themes to be developed over the semester, giving students a broad understanding of how an enterprise functions.

[ILRHR 690 Comparative Human Resource Management
Fall. 3 credits. Prerequisites: ILRHR 260/560, or permission of instructor. Not offered 2001–2002. Staff.
Surveys human resource practices in two key regions of the world: Western Europe and the Pacific Rim. The focus is on HR issues related to management of professional and managerial work force, such as selection and staffing, development, and appraisal and reward systems. Special attention is given to current changes and trends in the human resource management area (e.g., unification of Europe, transformation of Japanese firms). Implications for multinationals operating in these countries is also discussed.]

ILRHR 692 Training the Displaced and Disadvantaged
Spring. 3 credits. Prerequisite: permission of instructor. J. Bishop.
Examines public and private efforts to lower unemployment and underemployment of displaced and disadvantaged workers. The seminar examines the scope of the problem, its causes, and why specific programs have worked and others have not. Topics covered include training for displaced workers, rehabilitation of the disabled, job-search training, tax credits for hiring, vocational training, literacy instruction, EEO, public service employment, assisting new business, and industrial policy. The seminar also investigates how the structure of the economy influences the ability of targeted training and job creation to achieve sustained reductions in unemployment and draws lessons from the experience of other societies.

ILRHR 693 Training and Development in Organizations
Spring. 3 credits. Prerequisites: ILRHR 260/560 or equivalent, one course in statistics or permission of instructor. M. Cavanaugh.
The purpose of this course is to acquaint students with aspects of learning in organizations. We begin by discussing organizational learning, and then focus more narrowly on specific ways in which learning is achieved through the training and development functions. Topics throughout the semester include: how learning is linked to organizational strategy, how to determine that training is needed, issues regarding the design of training programs, current training techniques, evaluation strategies, and management development practices.

ILRHR 695 Education, Technology, and Productivity
Fall. 3 credits. J. Bishop.
This seminar investigates the nexus between the education and training in schools and at the workplace and the technological progressiveness, productivity, and competitiveness of firms, individuals, and nations. Students investigate: how technological progress is changing the nature of work and what this implies for reform of education and training; why United States productivity has increased so little in the past two decades; how education and training contribute to growth and competitiveness; why educational achievement has declined; and how the responsibility for education and training should be apportioned among individuals, firms, private nonprofit organizations, and government.

ILRHR 697 Special Topics in Resource Studies
Fall or spring. 3 credits. Staff.
Areas of study are determined each semester by the instructor offering the seminar.

ILRHR 698 International Human Resource Policies and Institutions
Spring. 3 credits. J. Bishop.
A comparative study of human resource policies and institutions in Western Europe, North America, Japan, and East Asia (with special emphasis on math and science education) and of the effects of these institutions on productivity, growth, and equality of opportunity. The institutions studied include primary and secondary education, apprenticeship, employer training, and higher education. Data on the consequences of policies is presented and an effort made to understand how human resource policies and institutions have contributed to the rapid growth and low levels of inequality in Europe, Japan, and the Pacific Rim nations. Another focus of the course is understanding the causes of the low levels of achievement of American high school students relative to their counterparts abroad.

ILRHR 760 Seminar in Human Resource Studies
Fall or spring. 3 credits. Prerequisites: ILRHR 560, ILRST 510/511, and ILRHR 669 and permission of instructor. P. Wright.
A "floating" seminar designed to give faculty and students an opportunity to pursue specific topics in detail, with an emphasis on theory and research. Topics vary from semester to semester. Interested students should consult current course announcements for details.

ILRHR 765 International Compensation
Spring. 4 credits. G. Milkovich.
Seminar focuses on international developments in employee compensation. Recent research, theoretical developments, and specific organizations' practices in a wide variety of countries are considered. Local national practices are the principal focus along with expatriates and others. The course draws upon research and theories from sociology, economics, psychology, and other disciplines. Four operative terms are seminar, comparative, compensation, and organization. Students should come to each session prepared to be active players in discussions. The focus is comparative, including research, theory, and practices of specific enterprises in different countries. Compensation includes all forms of pay including cash, benefits, allowances, and so on. Primary focus is at the organization level of analysis.

ILRHR 769 Topics in International Compensation Theory and Research
Spring. 4 credits. Prerequisite: ILRHR 669. G. Milkovich.
Examines recent developments in theory, research, and practice related to compensation. Discussion emphasizes the relevance of theory and research to compensation decision making. Students examine compensation and reward-related theories and research from supporting disciplines such as economics, psychology, sociology, and organizational behavior and evaluate their relevance to employee, managerial, executive, and international compensation.

ILRHR 790 ILR M.P.S. Program
Fall and spring. 1–9 credits.
Supervised research only for those enrolled in the ILR M.P.S. program.

ILRHR 798 Internship
For description, see the section on Collective Bargaining, Labor Law, and Labor History.

ILRHR 799 Directed Studies
For description, see the section on Collective Bargaining, Labor Law, and Labor History.

ILRHR 960 Workshop in Human Resource Studies
Fall and spring. 2 credits. Enrollment limited to M.S. and Ph.D. candidates. S-U grades only. Staff.
The workshop is designed to provide a forum for the presentation and critical discussion of current research being undertaken by graduate students, faculty members, and invited guests in the field of human resource studies. All M.S. and Ph.D. candidates in the Department of Human Resource Studies are urged to enroll; candidates in other departments are cordially invited. Each participant has an opportunity to benefit from the collective wisdom of the others in the formulation, design, and execution of his or her research, as well as to become current on the latest developments in the field.

ILRHR 961 Doctoral Research Seminar in Human Resource Management
Fall. 3 credits. Ph.D. candidates only. P. Wright.
This seminar is aimed at reading, understanding, and conducting research in HRM. Students should obtain thorough understanding of the current research in traditional areas of HRM such as validation, job analysis, EEO, selection, performance appraisal, compensation, and training, and should develop the skills necessary to evaluate, criticize, and contribute to the literature on HRM.

ILRHR 962 Doctoral Research Seminar in Strategic Human Resource Management
Spring. 3 credits. Ph.D. candidates only. P. Wright.
Seminar is aimed at reading, understanding, and conducting research in SHRM. The course should enables students to obtain a thorough understanding of the current research in Strategic HRM, and to develop the skills necessary to evaluate, criticize, and contribute to the literature on SHRM.

[ILRHR 963 Research Methods in HRM/ Strategic Human Resource Management
Spring. 3 credits. Ph.D. candidates only. Not offered 2001–2002. P. Wright.
Designed to build social science research skills, particularly in the area of human resource studies (HRS). Topics include measurement reliability, construct validity, design of studies, external validity, meta-analysis, critiquing/reviewing HRS research, publishing HRS research, and applications of statistical models of HRS issues.]

INTERNATIONAL AND COMPARATIVE LABOR RELATIONS

G. Fields, chair; J. Abowd, R. Batt, J. Bishop, F. Blau, G. Boyer, V. Briggs, M. Cook, I. DeVault, L. Kahn, H. Katz, S. Kuruvilla, L. Turner

ILRIC 333 Europe, United States, and Japan in a Global Economy
Fall. 3 credits (1 additional credit may be arranged). L. Turner.
Offers an introduction to the contrasting political economies of Germany, Britain, the European Union, Japan, and the Unites States in today's changing global economy. Emphasis is on (a) national differences and comparisons, and on the different strategies pursued by labor, business, and government in society in the face of growing world trade competition, political conflicts, production reorganization, and labor movement revitalization efforts.

ILRIC 337 Special Topics:
Fall. 3 or 4 credits. Staff.
Devoted to new topics in the field. The specific content and emphasis vary depending upon the interests of the faculty member teaching the course.

[ILRIC 339 The Political Economy of Mexico
Spring. 3 credits. Not offered 2001–2002. Next offered 2003. M. Cook.
Explores the range of challenges affecting contemporary Mexican politics, society, and economic development—from democratization to immigration to NAFTA. The course provides both an introduction to Mexican political economy for those with no prior background and an opportunity for students with more knowledge of Mexico to explore a research topic in greater depth.]

ILRIC 499 Directed Studies
For description, see the section, Collective Bargaining, Labor Law, and Labor History.

ILRIC 533 Europe, the United States, and Japan in a Global Economy
Fall. 4 credits. Graduate students. L. Turner.
See description for ILRIC 333. Graduate students attend class, take the midterm, and submit an analytical research paper at the end of the semester.

ILRIC 537 Special Topics
Fall or spring. 3 or 4 credits. Staff.
Devoted to new topics in the field. The specific content and emphasis vary depending upon the interests of the faculty member teaching the course.

ILRIC 630 Building a "Social Europe": Regional Integration in the Global Economy
Spring. 4 credits. Seminar designed for graduate students and seniors with permission. L. Turner.
Central questions addressed include: what have the European Union and its member nations done to develop and reform the social dimension in the 1990s and beyond? How are the major actors—labor, government, and business—positioned to influence social policy and industrial relations reform, and what strategies are they pursuing? How do EMU and enlargement affect the effort of European societies to defend and develop the social dimension of their market economies? What are the prospects for the "Social Europe" in an increasingly deregulated global economy?

ILRIC 631 Comparative Labor Movements in Latin America
Spring. 3 credits. M. Cook.
Examines the historical development of labor movements in Latin America, their role in national political and economic development, and the impact of economic liberalization, authoritarianism, and redemocratization on contemporary labor organizations in the region. Countries examined will include, but are not limited to, Mexico, Brazil, Argentina, Chile, Peru, and Venezuela.

ILRIC 632 Revitalizing the Labor Movement: A Comparative Perspective
Fall. 4 credits. Graduate seminar open to seniors with permission of instructor only. L. Turner.
Examines contemporary efforts in advanced industrial democracies to reform industrial relations. The first half of the course examines contemporary industrial relations' reform efforts in the United States, including innovative organizing strategies; new calls for union militance; business strategies for a "union-free" environment; efforts at labor-management cooperation; and the report of the Dunlop Commission. The second half covers Britain—the Thatcher reforms of the 1980s and the current labor-backed works council movement; France—the Auroux Laws of the 1980s and their effects; and Germany—the transformation of industrial relations in eastern Germany since 1989.

ILRIC 633 Labor, Industry, and Politics in Germany
Fall. 4 credits. Open to seniors with permission and graduate students. L. Turner.
Is the successful postwar "social partnership" model of organized capitalism in the Federal Republic of Germany viable in the twenty-first century? To answer this question, this course covers the works councils and codetermination, the rise of a strong postwar labor movement, the contemporary German version of social partnership, with an emphasis on current events and the new challenges for German industry and labor posed by German unification and the single European market.

[ILRIC 635 Labor Markets and Income Distribution in Developing Countries
Spring. 4 credits. Prerequisite: ILRLE 240 or Economics 313 or permission of instructor. Not offered 2001–2002. G. Fields.
A course analyzing who benefits and how much from economic growth in developing countries and how income distribution would be affected by various public policies. Topics to be covered include: poverty, inequality, social welfare, and economic growth-theory and evidence; poverty profiles, earnings functions, and decompositions; employment, unemployment, wages, and labor markets; and an introduction to benefit-cost analysis, with application to the economics of education.]

ILRIC 636 Comparative History of Women and Work (also WOMNS 636)
Fall. 4 credits. Permission of instructor. I. DeVault.
Explores the similarities and differences between different cultures' assumptions about the work of women as well as women's experiences in varying work circumstances

throughout history. Beginning with theoretical pieces and overviews of the history of women and work, most of the course consists of in-depth examinations of specific work situations or occupations across time and geography. Comparative examples are taken from the United States, Europe, and the Third World.

[ILRIC 637 Labor Relations in Asia
Spring. 3 credits. Permission of instructor required. Not offered 2001–2002. Next offered 2003. S. Kuruvilla.
A comparative survey of the industrial relations systems of selected Asian nations such as Japan, South Korea, Thailand, Malaysia, Singapore, Hong Kong, China, and several others. The emphasis is on economic development strategies and industrial relations policies in these countries. Industrial relations practices, the extent of union organization, and labor force demographics of these countries is examined. The primary objective is to provide students with an introduction to industrial relations systems in Asia. The countries chosen are representative, but not exhaustive.]

[ILRIC 638 Labor, Free Trade, and Economic Integration in the Americas
Spring. 3 credits. Limited. Open to seniors and graduate students; juniors by permission. Not offered 2001–2002. Next offered 2003. M. Cook.
Analyzes the contemporary movements toward free trade and regional economic integration in the Western Hemisphere. Special attention is paid to labor's role in this process. Examines the origins and implications of the North American Free Trade Agreement (NAFTA) and looks at integration schemes in South America (Mercosur), Central America, and the Caribbean, and at hemisphere-wide initiatives. A research paper is required.]

ILRIC 639 Building a Social Europe (also GOVT 736)
Spring. 4 credits. Graduate students or seniors by permission. L. Turner.
This course considers the political, economic and labor challenges of today's European Union, emphasizing efforts to protect and develop a "social market" within the greater deregulated global economy.

ILRIC 730 Research Seminar on Labor Markets and Economic Development
Fall or spring. 3 credits. Prerequisite: open to M.S. and Ph.D. students only. G. Fields.
Research seminar for students writing theses or dissertations on aspects of labor markets and economic development. Addresses research questions, methodologies, and contributions in the areas of employment and unemployment, income and earnings, educational and human resource development, welfare economics, and economic growth. Presentations and written papers are required.

[ILRIC 739 The Political Economy of Mexico
Spring. 3 credits. Not offered 2001–2002. Next offered 2003. M. Cook.
For course description, see ILRIC 339.]

ILRIC 790 ILR M.P.S. Program
Fall and spring. 1–9 credits.
Supervised research only for those enrolled in the ILR M.P.S. Program.

ILRIC 799 Directed Studies
For description, see the section, Collective Bargaining, Labor Law, and Labor History.

Other courses approved to fulfill ILRIC distribution

ILRCB 304 Latin American Labor History
Fall. J. Cowie.
For description, see the section, Collective Bargaining, Labor Law, and Labor History.

ILRHR 456 International Human Resource Management
Spring. Staff.
For description, see the section, Human Resource Studies.

ILRHR 461 The Design of Work Systems: Comparative and Interdisciplinary Perspectives
Fall or spring. R. Batt.
For description, see the section, Human Resource Studies.

ILRHR 466 Comparative Human Resource Management
Fall. Staff.
For description, see the section, Human Resource Studies.

ILRHR 469 Immigration and the American Labor Force
Fall and spring. V. Briggs.
For description, see the section, Human Resource Studies.

ILRHR 690 Comparative Human Resource Management
Fall. Staff.
For description, see the section, Human Resource Studies.

ILRHR 698 International Human Resource Policies and Institutions
Spring. J. Bishop.
For description, see the section, Human Resource Studies.

ILRLE 444 The Evolution of Social Policy in Britain and America
Spring. G. Boyer.
For description, see the section, Labor Economics.

ILRLE 446 Economy History of British Labor 1750–1940 (also ECON 459)
Spring. G. Boyer.
For description, see the section, Labor Economics.

ILRLE 448 Topics in Twentieth-Century Economic History: The Economics of Depression and the Rise of the Managed Economy
Fall. G. Boyer.
For description, see the section, Labor Economics.

INTERDEPARTMENTAL COURSES

ILRID 150 Freshman Colloquium
Fall. 1 credit. Open only to ILR freshman. S-U only. Staff.
This course is offered to acquaint new freshman students with some of the issues and disciplines in the field of industrial and labor relations, and, establish acquaintanceship among members of the ILR faculty and small, randomly assigned groups of students. The course includes a plant visit and several meetings early in the semester designed to introduce issues encountered in studying the employment relationship.

ILRID 355 Documentary Research Methodology
Fall. 3 credits. P. Sione.
Critical evaluation of evidence is a fundamental skill for every professional engaged in the processing of information. Lawyers, arbitrators, and human resources managers are asked to find, assess, and use the appropriate sources to build their case, for a legal decision or the formulation of a particular policy. This course helps students develop the ability to analyze a broad range of retrospective evidence, critically evaluate it as to pertinence and accuracy, and place it in a well thought-out and coherent context. Designed to provide research methodology training specifically for professionals in the labor field. Topics are selected from relevant studies in Industrial and Labor Relations.

ILRID 450 Workplace Diversity: Stepping into the 21st Century
Spring. 1 credit. S-U grades only. Prerequisite: ILRHR 260 and ILR seniors only. Limited to 50. Staff.
Provides an orientation to diversity in the workplace and to the expectations and challenges presented for future workplace leadership. With an emphasis on hands-on experiential learning, the course begins by familiarizing class participants with current practioner approaches to diversity awareness training and competency building. Course focus then shifts to examine diversity as an issue of organizational change. Class participants consider the range of policies, practices, and procedures being used to create workplaces that are both diverse and inclusive. Dialogues and case study presentations with invited workplace diversity leaders offer participants an opportunity to learn from an insider's perspective about the experiences, successes, and challenges of making diversity work.

ILRID 451 Science, Technology, and the American Economy
Spring. 4 credits. V. Briggs.
The industrial revolution did not begin in the United States, but the nation became the world's first technological society. Attention is given to the evolutionary confluence of science, technology, mathematics, religion, and capitalism in the formation of the U.S. economy, its institutions, and its labor force. Primary attention is given to the post–World War II economic developments. The vantage point is the linkage with employment, unemployment, income, and productivity considerations. Public policy issues (such as the employment impact of the computer, research and development policy, national defense influences, the "agricultural revolution," savings and investment rates, and labor force preparedness) are explored. Critical concerns pertaining to environmental impacts, income polarization, and consumerism are also examined.

ILRID 452 Writing in Industrial and Labor Relations
Fall or spring. 3 credits. J. Farley.
Requires close reading of four or five books related to the term's theme in the field of industrial and labor relations and careful writing about them. Students also have an opportunity to practice writing about the world of work for different audiences.

ILRID 790 ILR M.P.S. Program
Fall and spring. 1–9 credits.
Supervised research only for those enrolled in the ILR M.P.S. program.

LABOR ECONOMICS

L. Kahn, chair; J. Abowd, F. Blau, G. Boyer, R. Ehrenberg, G. Fields, R. Hutchens, G. Jakubson, R. Smith

ILRLE 140 Development of Economic Institutions
Fall. 3 credits. Prerequisite for non-ILR students: permission of instructor. G. Boyer.
Provides students with an understanding of the historical roots of the economic system currently dominant in Western Europe and the United States. The course focuses on the process of European economic growth prior to 1914, the effect of industrialization on labor in Great Britain, and the historical evolution of economic thought from Adam Smith to J. M. Keynes.

ILRLE 240 Economics of Wages and Employment (also ECON 341)
Fall and spring. 3 credits. Prerequisites: Economics 101–102, Economics 313, or permission of instructor.
Applies the theory and elementary tools of economics to the characteristics and problems of the labor market. Considers both the demand (employer) and supply (employee) sides of the market to gain a deeper understanding of the effects of various government programs and private decisions targeted at the labor market. Topics covered include employment demand, basic compensation determination, education and training, benefits and the structure of compensation, labor-force participation and its relation to household production, occupational choice, migration, labor-market discrimination, and the effects of unions.

ILRLE 340 Economic Security (also ECON 451)
Spring. 3 credits. Prerequisites: ILRLE 240 or equivalent.
Considers the economic and social effects of income security measures. Analyzes programs offering protection against economic loss due to industrial accident, temporary and permanent disability, illness, old age, premature death, and unemployment, as well as private efforts to provide security, and the problems of integrating public and private programs. Proposals for amending or modifying economic security measures are also considered.

ILRLE 440 Special Topics in Labor Economics
Fall or spring. 4 credits. Staff.
An undergraduate seminar whose topic changes depending on semester and instructor.

ILRLE 441 Income Distribution (also ECON 455)
Fall. 4 credits. Prerequisite: ILRLE 240 or Economics 341. R. Hutchens.
Explores income distribution in the United States and the world. Topics to be covered include functional and size distributions of income, wage structure, income-generating functions and theories, discrimination, poverty, public policy and income distribution, and changing income distribution and growth. Students who have taken PAM 370 may not receive credit for 441.

ILRLE 442 The Economics of Employee Benefits (also ECON 456)
Fall. 4 credits. Prerequisites: ILR 240 or equivalent. F. Blau.
An in-depth treatment of the economics and financial management and administration of all employee benefits: health care, insurance, retirement income, family-care benefits, executive incentive plans, and other compensation provided as a service or contingent financial package to employees. Detailed international comparisons of health care and retirement systems are included.

ILRLE 444 The Evolution of Social Policy in Britain and America
Spring. 4 credits. Prerequisite: ILRLE 240 or equivalent. G. Boyer.
Surveys the history of social policy in Great Britain and the United States from 1800 to the adoption of the British welfare state after World War II. Topics covered include: the role of poor relief in the early nineteenth century; the changing relationship between public relief and private charity; the adoption of social insurance programs and protective labor legislation for children and women; government intervention in the Great Depression; and the beginnings of the welfare state.

ILRLE 445 Women in the Economy (also ECON 457 also WOMNS 446)
Fall. 4 credits. Prerequisite ILRLE 240 or equivalent.
Examines the changing economic roles of women and men in the labor market and in the family. Topics include: a historical overview of changing gender roles; the determinants of the gender division of labor in the family; trends in female and male labor force participation; gender differences in occupations and earnings; and the consequences of women's employment for the family.

ILRLE 446 Economic History of British Labor 1750–1940 (also ECON 459)
Fall or spring. 4 credits. Prerequisite: ILRLE 240 or equivalent. G. Boyer.
Examines various aspects of British labor history from the beginning of the Industrial Revolution until World War II. Specific topics include: monetary and nonmonetary changes in workers' living standards; internal migration and emigration; the London labor market; the extent of poverty and the evolution of the welfare state; Luddism and Chartism; and the development of trade unions.

ILRLE 448 Topics in Twentieth-Century Economic History: The Economics of Depression and the Rise of the Managed Economy (also ECON 458)
Spring. 4 credits. Prerequisites: ILRLE 240 or Economics 314. G. Boyer.
Topics covered include: the causes of the Great Depression in the United States; the economics of the New Deal; the causes of high unemployment in interwar Great Britain; the rise of Keynesian economics and the development of demand management policies in Great Britain and the United States after 1945.

ILRLE 495 Honors Program
Fall and spring (yearlong course). 3 credits each term.
For description, see the section on Collective Bargaining, Labor Law, and Labor History.

ILRLE 497–498 Internship
Fall and spring. 3 and 6 credits.
For description, see the section on Collective Bargaining, Labor Law, and Labor History.

ILRLE 499 Directed Studies
For description, see the section on Collective Bargaining, Labor Law, and Labor History.

ILRLE 540 Labor Economics
Fall. 3 credits. Prerequisites: Economics 101–102 or Economics 103 or equivalent. Required of graduate students majoring or minoring in labor economics and M.I.L.R. candidates.
Applies the theory and elementary tools of economics to the characteristics and problems of the labor market. The course considers both the demand (employer) and supply (employee) sides of the market to gain a deeper understanding of the effects of various government programs and private decisions targeted at the labor market. Topics covered include employment demand, basic compensation determination, education and training, benefits and the structure of compensation, labor-force participation and its relation to household production, occupational choice, migration, labor-market discrimination and the effects of unions.

[ILRLE 544 Labor Market and Personnel Economics
4 credits. Offered only in New York City for the M.P.S. Program. Not offered 2001–2002. Staff.
A four-module course, in which the first module covers the basic elements of supply and demand in the labor market, the second and third modules cover the "new personnel economics" (emphasizing economic issues in a firm that relate to selecting, training, assigning, motivating, and compensating workers), and the final module covers key institutions and economic security issues (including unemployment, pensions, disability, discrimination, and unions). The goals of this course are to have students learn to analyze both business and public policy problems, taking into account both basic principles of economic theory and the relevant institutional environments.]

ILRLE 642 Economic Analysis of the Welfare State (also ECON 460)
Spring. 4 credits. R. Hutchens.
Uses the tools of public economics to analyze modern welfare states. Although examples are drawn from several countries, the course focuses on the U.S., Canada, and Sweden. What are the rationales for the level of government intervention in these states, and how do these rationales square with notions of market failure? What are the economic costs and benefits of taxes, transfers, and regulations in these states? Can voting models explain the growth and operation of welfare states? The possible answers to these questions are discussed.

ILRLE 648 Economic Analysis of the University (also ECON 342)
Fall. 4 credits.
Seeks to illustrate the complexity of decision making in a nonprofit organization and to show how microeconomic analysis in general, and labor market analysis in particular, can be

usefully applied to analyze resource allocation decisions at universities. Among the topics covered are financial aid, tuition, admissions policies, endowment policies, faculty salary determination, the tenure system, mandatory retirement policies, merit pay, affirmative action, comparable worth, collective bargaining, resource allocation across and within departments, undergraduate versus graduate education, research costs, libraries, athletics, and "socially responsible" policies. Lectures and discussions of the extensive readings are supplemented by presentations by Cornell administrators and outside speakers who have been engaged in university resource allocation decisions or have done research on the subject.

ILRLE 741 Applied Econometrics I
Fall. 4 credits. S-U or letter. G. Jakubson.
Considers methods for the analysis of longitudinal data, that is, data in which a set of individual units are followed over time. Focus is on both estimation and specification testing of these models. Students consider how these statistical models are linked to underlying theories in the social sciences. Course coverage includes panel data methods (fixed, random, mixed effects models, etc.) factor analysis, measurement error models, and general moment structure methods.

ILRLE 742 Applied Econometrics II
Spring. 4 credits. Letter or S-U grades. J. Butler.
Covers statistical methods for models in which the dependent variable is not continuous. Covers: models for dichotomous response (including probit and logit); polychotomous response (including ordered response and multinomial logit); various types of censoring and truncation (e.g., the response variable is only observed when it is greater than a threshold); and sample selection issues. Includes an introduction to duration analysis. Covers not only the statistical issues but also the links between behavioral theories in the social sciences and the specification of the statistical model.

ILRLE 743 Applied Econometrics III
Spring. 4 credits. Letter only. Prerequisites: ILRLE 741–742 or permission of instructor. ILRLE 741, 742, and 743 constitute a Ph.D.-level sequence in applied microeconometrics. G. Jakubson.
Covers topics not covered in ILRLE 741-742, including further development of duration analysis, panel data methods for nonlinear models, quantile regression and related techniques, and an introduction to nonparametric and semiparametric methods. Additional topics as suggested by their use in applied areas of social science. Covers not only the statistical issues but also the links between behavioral theories in the social sciences and the specification of the statistical model. Also develops a general framework for the techniques covered in the ILRLE 741–742–743 sequence.

ILRLE 744 Seminar in Labor Economics I (also ECON 641)
Spring. 3 credits. ILRLE 744, 745, and 746 constitute the Ph.D.-level sequence in labor economics.
Course includes reading and discussion of selected topics in labor economics. Applications of economic theory and econometrics to the labor market and human resource areas are stressed.

ILRLE 745 Seminar in Labor Economics II (also ECON 642)
Fall. 3 credits. ILRLE 744, 745, and 746 constitute the Ph.D.-level sequence in labor economics.
Course includes reading and discussion of selected topics in labor economics. Applications of economic theory and econometrics to the labor market and human resource areas are stressed.

ILRLE 746 Seminar in Labor Economics III (also ECON 643)
Spring. 4 credits. ILRLE 744, 745, and 746 constitute the Ph.D.-level sequence in labor economics.
Course includes reading and discussion of selected topics in labor economics. Applications of economic theory and econometrics to the labor market and human resource areas are stressed.

ILRLE 747 Economics of Education
Spring. 4 credits. R Ehrenbeg.
A survey of the research on a wide variety of issues at the elementary, secondary, and higher education levels. Examples of the issues addressed at the elementary and secondary level are the labor markets for teachers and administrators, educational production functions, class size experiments, financing and voter behavior, special education, and school choice. At the higher education level, issues addressed include public and private funding, financial aid and tuition policies, faculty labor markets and Ph.D. production. While the emphasis is on the American educational system, research from other countries may also be discussed. Interested students other than economics and labor economics Ph.D. students should speak to the instructor before enrolling for the course.

ILRLE 748 Economics of Employee Benefits
Fall. 4 credits.
Students in this course attend the lectures in ILRLE 442 (see description for 442) but have additional course requirements. If enrollment warrants, they will also meet separately at a time TBA for discussion of topics in 442 and additional topics.

ILRLE 749 Economics of Development (also ECON 772)
Fall. 4 credits. Prerequisites: first-year graduate economic theory and econometrics.
Analytical approaches to the economic problems of developing nations. Topics to be covered include: some old and new directions in development economics thinking; the welfare economics of poverty and inequality; empirical evidence on who benefits from economic development; labor market models; project analysis with application to the economics of education; and development policy.

ILRLE 790 ILR M.P.S. Program
Fall and spring. 1–9 credits.
Supervised research only for those enrolled in the ILR M.P.S. program.

ILRLE 798 Internship
For description, see the section on Collective Bargaining, Labor Law, and Labor History.

ILRLE 799 Directed Studies
For description, see the section on Collective Bargaining, Labor Law, and Labor History.

ILRLE 940 Workshop in Labor Economics
Fall and spring. 3 credits. Intended for Ph.D. students who have started to write their dissertations.
Presentations of completed papers and work in progress by faculty members, advanced graduate students, and speakers from other universities. Focus is on the formulation, design, and execution of dissertations.

ORGANIZATIONAL BEHAVIOR

P. Tolbert, chair; S. Bacharach, T. Hammer, E. Lawler, M. Lounsbury, W. Sonnenstuhl, R. Stern, L. Williams

ILROB 170 Introduction to Micro Organizational Behavior and Analysis: The Social Psychology of the Workplace
Spring. 3 credits. Staff.
This introductory (survey) course considers the basic individual and group processes in the workplace. At the individual level, students study personality, motivation, perception, attitude formation, and decision making. On the group level, group dynamics, leadership, power and influence, and culture are emphasized.

ILROB 171 Introduction to Macro Organizational Behavior and Analysis
Fall. 3 credits. Staff.
The relationship between industry and the economy as a whole and its implications for other social institutions in American society (including stratification, politics, and American values) is discussed. The course moves from classical sociological theory to the analysis of complex organizations. The central focus of the course is the study of industrial organizations and of complex organizations in general, emphasizing authority relations, goals, the division of labor, bureaucracy, and organizational design.

ILROB 320 The Psychology of Industrial Engineering
Fall. 4 credits. T. Hammer.
A study of the human factors in the industrial engineering of work, workplaces, tools, and machinery. The course examines the aspects of individual and social psychology that operate in the work setting and that should be taken into account in the design of jobs. These include limitations of the human sensory system; individual difference in skills, abilities, motives, and needs; group dynamics; intrinsic motivation; job satisfaction; conflict.

ILROB 321 Group Solidarity (also SOC 311)
Fall. 4 credits. M. Macy.
What is the most important group that you belong to? What makes it important? What holds the group together, and how might it fall apart? How does the group recruit new members? Make and enforce rules? Do some members end up doing most of the work while others get a free ride? This course explores these questions from an interdisciplinary perspective, drawing on sociobiology, economics, and social psychology. Alternative theories of group solidarity are applied to a series of case studies such as: urban gangs, spiritual communes, the civil rights movement, pro-life activists, athletic teams, work groups, and college fraternities.

ILROB 322 Service Learning (also SOC 323)
Fall. 4 credits. M. Lounsbury.
Service-learning is a course-based, credit-bearing educational experience in which students participate in organized service that contributes to community well-being. Students reflect on the service to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of civic responsibility. The course includes a service-learning requirement that is designed to involve students in projects at local governmental and community organizations. Students draw on sociological readings to examine the relationship between organizations, society and social change. Theoretical perspectives learned in class complement field-based activity; students develop a richer understanding of how organizations and their members are connected to society.

ILROB 324 Gender and Work (also SOC 314/514 and WOMNS 314/514)
Spring. 4 credits. M. Brinton.
The purpose of this course is to familiarize students with the field of gender stratification. The first part of the course examines long-term changes in women's labor force participation and the division of labor between the sexes as societies industrialize. Students consider theoretical work as well as empirical case studies of a number of countries ranging from Taiwan to Ireland. The second part of the course focuses on gender and work in highly industrialized societies, and includes empirical studies of the gendered division of labor in households and the labor market of the United States in particular. The structure of the course is lecture one day per week and detailed discussion and critique of selected readings on the second day. Students take a mid-term exam and prepare a research proposal on some aspect of gender and work. During the last two weeks of the course, students present synopses of their research proposals which are discussed and constructively critiqued by their classmates.

ILROB 328 Cooperation, Competition, and Conflict Resolution
Spring. 4 credits. Prerequisite: one course in social psychology or equivalent. Staff.
An examination of theory and empirical evidence relating to the resolution of interpersonal, intergroup, and international conflict. Specific attention is devoted to studying factors that contribute to the development of cooperative or competitive bonds between parties to a conflict. The following topics are studied: the availability and use of threat; the credibility, intensity, and costs of threat; fractioning and escalating conflict. Personality and situational factors that regulate conflict intensification are stressed.

ILROB 329 Organizational Cultures
Fall or spring. 3 credits. Prerequisite: one or more courses in sociology.
W. Sonnenstuhl.
Reviews the concept of culture as it has evolved in sociology and anthropology, applying it to formal organizations in workplaces such as corporations and unions. The course first examines the nature of ideologies as sense-making definitions of behavior, concentrating on the cultural forms that carry these cultural messages, rituals, symbols, myths, sagas, legends, and organizational stories. Considerable attention is given to rites and ceremonials as a cultural form in organizational life that consolidates many of these expressive forms into one. The course examines types of ceremonial behavior such as rites of passage, rites of enhancement, and rites of degradation, including the role of language gestures, physical settings, and artifacts in ceremonial behavior. The presence of subcultures and countercultures in organizational behavior will also receive attention, especially the part played by occupational subcultures in formal organizations.

ILROB 370 The Study of Work Motivation
Fall. 4 credits. Open to juniors and seniors.
T. Hammer.
Designed to acquaint the student with the basic concepts and theories of human motivation with implications for job design and organizational effectiveness. Focus is on theories of worker motivation and on research approaches and results as they apply to the performance of individuals and groups in formal organizations. Readings are predominantly from the field of organizational psychology, supplemented by relevant contributions from experimental and social psychology. Each student designs, executes, and analyzes a research study of his or her own.

ILROB 371 Individual Differences and Organizational Behavior
Fall or summer. 4 credits. Recommended: some acquaintance with the substance and methods of behavioral or social science.
Staff.
Examines personality from a comparative psychodynamic point of view. Social behavior, authority relationships, and work motivation are used to illustrate how various theories could be applied to understand behavior and experience in organizations.

ILROB 373 Organizational Behavior Simulations
Fall. 3 credits. Prerequisites: ILROB 170 and 171 or equivalent. Limited enrollment.
R. Stern.
Basic principles of organizational behavior are studied through readings and participation in simulation games. Simulations model traditional organizations and cooperatives. Games model executive decision making, running a company, assembly work, and cooperative decision making. Organizational design, decision making, conflict, cooperation, and power are the central topics of discussion. The contrasting bases of power in the organizations permits the study of the assumptions underlying organization structure and process.

ILROB 420 Contemporary Organizational Behavior Applications
Fall or spring. 3 credits. Prerequisites: ILROB 170 and 171. L. Gasser.
An exploration of current practical applications of OB theory in organizations. Using a range of contemporary resources, students sift through practitioner articles and research; manage discussions; meet with managers, consultants, and employees; and explore organizational issues and problems from micro and macro perspectives in a political and legal context. Students also develop a toolbox of knowledge and skills to effectively carry out several organizational interventions or development initiatives. Choice of topics may differ to focus on contemporary issues such as: emotional intelligence, influencing organizational climate and morale, engaging strategic planning processes, managing large-scale participative techniques, using job or workplace design concepts, applying SWOT analysis, developing effective teamwork, managing diversity, applying quality management tools, etc.

ILROB 421 Regulating the Corporation
Spring. 4 credits. R. Stern.
Examines public and private power from an organizational perspective. The resource-dependence approach to organization-environment relations provides a framework for interpreting government attempts at the regulation of corporate behavior. Topics cover the structure and functioning of government regulatory agencies and corporate responses to regulation, including corporate strategy, change, and political influence. Business ethics and corporate social responsibility are considered along with the role of interest groups such as consumer or citizen organizations. Research and case materials focus on the implementation of environmental protection, occupational health and safety, equal opportunity, antitrust, securities, and consumer regulations.

ILROB 422 Organizations and Deviance
Fall. 3 credits. Enrollment limited to 60.
W. Sonnestuhl.
Focuses upon the deviant actions of organizations, including such behaviors as price fixing, environmental pollution, illegal campaign contributions, and discrimination in hiring and promotion. Examines the origins of such behaviors in organizations, the processes by which they became institutionalized, and the processes by which they become defined as deviant organizational actions. Within this context, the course examines such contemporary cases as Exxon's Valdez oil spill, Iran–Contragate, drug testing, and the federal savings and loan scandal. These events raise troubling questions about what it means to live and work in an organizational society, and they cannot be dismissed as instances of a few individuals gone bad.

ILROB 425 Sociology of Industrial Conflict
Spring. 4 credits. R. Stern.
The course focuses on the social, economic, and political causes of industrial conflict. The nature of work and the employment relationship provide the foundation for understanding both individual and collective expressions of conflict in work settings. Worker background, psychological contracts and authority relations set the stage for studying conflict expressions including strikes, labor turnover, absenteeism, sabotage, accidents, grievance filing, violence, and other forms of conflict at work.

ILROB 427 The Professions: Organization and Control
Fall. 3 credits. Prerequisite: permission of the instructor. P. Tolbert.
Focuses on the sources of power and control exercised by professional groups in contemporary society. A number of issues are examined in this context including: the role of professions in society, processes through which an occupational group becomes defined as a profession, sources of control that professional associations have over their members, relations between professionals and nonprofessionals in organizations, and the relationship between unionization and professionalization of occupations.

ILROB 429 Organizational Politics and Institutional Change
Spring. 2 credits. 7 weeks. Limited to juniors and seniors with permission of the instructor. Please see instructor before the first class. S. Bacharach.
Examines the market, cultural, political, and structural forces that change the organizational "rules of the game," how those changes affect individuals and organizations, and the distortions that occur as individuals and organizations attempt to adjust to a new unstable order. Issues to be examined include power, corruption, dealmaking, rationality, uncertainty, and competition. Course requirements include completing a major research paper and leading a class discussion.

ILROB 470 Group Processes
Fall. 3 credits. Prerequisites: ILROB 170 and 171 or equivalent. Permission of instructor. E. Lawler.
A review of theoretical approaches and selected research on group phenomena, including the formation of groups, the structure of group relations, and group performance. Specific topics include conformity and obedience, status and power relations, tactics of influence, solidarity and commitment, the management of emotion, the emergence and change of microcultures, and the role of groups in networks and organizations.

ILROB 472 Applied Organizational Behavior
Fall. 3 credits. Prerequisites: ILROB 170 and 171. S. Bacharach.
Introduces students to intermediate theory of organizational behavior. The course specifically concentrates on teaching students to use organizational theories for analytical and applied purposes. Among the issues to be addressed are organizational structure, work processes, organizational politics, organizational design, job design, incentive systems, and quality-of-work-life programs.

ILROB 495 Honors Program
Fall and spring (yearlong course). 3 credits each term.
For description, see the section, Collective Bargaining, Labor Law, and Labor History.

ILROB 497–498 Internship
Fall and spring. 3 and 6 credits.
For description, see the section, Collective Bargaining, Labor Law, and Labor History.

ILROB 499 Directed Studies
For description, see the section, Collective Bargaining, Labor Law, and Labor History.

ILROB 520 Organizational Behavior and Analysis
Fall or spring. 3 credits. Staff.
Survey of concepts, theories, and research from the fields of organizational and social psychology as these relate to the behavior of individuals and groups in organizations. Job attitudes, motivation, performance, leadership and power, group formation, perception, and organizational climate. A preliminary course for advanced work in organizational behavior.

ILROB 622 Sociology of Markets (also SOC 622)
3 credits. M. Lounsbury.
Since World War II, the diffusion of markets in Asia, Eastern Europe, and Latin America as well as changes in the structure of Western economies has reinvigorated questions about how markets are socially structured. Drawing on the literature in economic sociology, this course explores the social, cultural, economic, and political factors that shape the emergence and dynamics of markets. Among the issues addressed are: the social organization of markets, market discrimination, the cooperative aspects of market formation and functioning, the role of government and other institutional arrangements, the relationship of economic change to broader social forces such as social movements, and the shift towards globally market-oriented economies.

ILROB 623 Micropolitics in Organizations
Spring. 3 credits. Prerequisites: ILROB 170 and 171. Limited, permission of instructor. S. Bacharach.
Examines micro-political processes in organizations. Neo-Macchiavellain, Marxian, and Weberian approaches to organizational politics are specifically analyzed. An attempt is made to understand how the micro-political rules of organizational games are institutionalized in change. Among the ideas discussed are the institutionalization of ideology and specification of the relationships among power, tactics, and strategy. Interest groups and coalition politics are examined in terms of conflict and bargaining. Other issues discussed include corruption, dealmaking, and competition. Examples are drawn from both the private and public sectors. Seminar requirements include an in-class presentation and a major paper and/or take-home final exam.

ILROB 624 Groups in Work Organizations
Fall. 4 credits. Enrollment limited. Permission of instructor required. Staff.
This is an experiential learning course designed primarily for advanced students who have a comprehensive background in the theory and methods of the behavioral sciences. Work group members study their roles and relationships to each other, the task, other work groups, and especially authorities. Students write a number of self-reflective papers in which they conceptualize their experiences and relate them to theory and method in organizational behavior and experience.

ILROB 625 Conflict, Power, and Negotiation
Fall. 3 credits. Open to seniors and graduate students. Permission of instructor is required. Limited enrollment. E. Lawler.
Theoretical seminar adopts a power perspective on bargaining and conflict resolution. Examines how power relations and power processes affect tactics in bargaining and also when power relations inhibit or promote conflict resolution. "Power" is viewed in the course as a capability, embedded in a social structure, and tactics are the action based on or using such power. The seminar gives overview of several theoretical approaches to conflict and bargaining (e.g., rational choice, cognitive, social exchange) and places the power perspective in this context.

ILROB 626 Organizations and Social Inequality
Spring. 3 credits. P. Tolbert.
Examines the central role that organizations in industrial societies play in allocating income, status, and other resources to individuals. A variety of theoretical explanations of social inequality are examined, and the social policy implications of each are considered.

ILROB 627 Leadership in Organizations
Spring. 3 credits. Prerequisites: two organizational behavior courses at the 300 level or advanced courses in sociology or psychology. Staff.
An examination of theories and research findings from the behavioral sciences that are relevant to leadership and the influence process in groups and organizations. Personality, situational factors, intergroup processes, interpersonal perception as well as the motivation to both lead and follow are discussed. The implications for leadership training, organization development, and action research are explored.

ILROB 628 Cross-Cultural Studies in Organizational Behavior
Spring. 3 credits. Limited. Permission of instructor before registering in course. Staff.
Designed for students interested in social psychological theory and research in international culture comparisons of behavior and experience in organizations. Variables such as power distance, individualism-collectivism, universalism-particularism, and attitudes toward authority as well as work motivation are examined. Upon completion of the readings and discussion of conceptual materials and consideration of several major international comparison studies, each student prepares and presents a paper on a topic of his/her own choice usually related to his/her country of origin (China, Japan, German, United States, etc.).

ILROB 670 Semester in Manufacturing
Spring. 15 credits. Open to master's and Ph.D. students in Industrial and Labor Relations with permission of instructor.
Intended for students who want to work as professionals or who have a strong interest in the manufacturing industries. The course is taught by an interdisciplinary faculty team from the College of Engineering, the Johnson School of Management, and the School of Industrial and Labor Relations. Course material is based on plant visits and project work with local industry. Student participation is in interdisciplinary teams with members representing the three colleges. Course content concentrates on four major issues thought to make a competitive difference in today's economic environment: the changing environment for product design; rapid-response production systems; organization, management, and compensation of the manufacturing team; and performance measurement.

ILROB 671 Organizations as Social Networks
Spring. 3 credits. Prerequisites: one or more courses in organizational behavior, sociology, psychology, anthropology, or political science. A course in statistics or research methods is helpful. Staff.
Increasing attention has been devoted to the idea that social structures can be fruitfully investigated as social networks. In particular, organizational and inter-organizational structures may be analyzed as patterned relationships among individuals, groups, and even other organizations. Such networks appear to be strong predictors of a variety of social dynamics including attitude similarity, the diffusion of innovation, turnover, and the allocation of organizational resources. A variety of methods for collecting and analyzing network data including: graph

theory, sociometry, clique detection, centrality analysis, blockmodeling, and the quadratic assignment procedures are used. In addition to reading recent published research, this course involves work with actual data sets and relevant computer programs.

ILROB 674 The Social Psychology of Behavior and Experience in Organizations
Fall. 3 credits. Prerequisite: ILROB 170 and 171 or ILROB 520. Staff.
Considers theories that seek to explain behavior at the individual, group, and organizational level. Work motivation, leadership, and the member composition and dynamics of groups are discussed. Harmony, conflict, and other aspects of the relationships among groups in the organization are evaluated.

ILROB 676 Systems of Labor Participation in Management
Fall. 4 credits. Prerequisites: senior standing and permission of instructor.
Examines the theory and practice of worker participation in systems ranging from informal shop-level participation to self-management. Special emphasis is placed on socio-technical systems of job design and work restructuring that give workers control over the labor process. Attention is also given to legislated programs of participation (codetermination) and to participation in employee-owned firms.

ILROB 679 Methods of Observation and Analysis of Behavior
Fall or spring. 4 credits. Permission of instructor required. Staff.
Focuses on qualitative methods and emphasizes learning by doing. The course examines different approaches to the collection and analysis of data. Students learn a variety of data collection techniques for understanding individual and collective behavior including: participant observation, in-depth interviews, and working with archival materials. The course also emphasizes the constant comparative method as a basic technique for data analysis. This technique is the basis of such qualitative computer programs as Ethnograph and Nudist. Students conduct their own research projects. Students, who wish to use qualitative methods either for a senior honors thesis, master's thesis, or doctoral dissertation, are encouraged to take this course. Because of the intensive nature of the course, class size is limited to 25 students.

ILROB 720 Issues of Measurement in Research on Organizations (Instrumentation)
Fall. 4 credits. Staff.
Concerns the study of tests and measures used to assess central variables in organizational behavior and related fields. Students learn where to find measures suitable for their research purposes and examine the theories that define the constructs being measured; the empirical information available about different measures—construction, reliability, and validity; and the ways in which the instruments have been used in research and practice.

ILROB 721 Advanced Micro Organizational Behavior
Spring. 3 credits. Staff.
Examines the historical development of psychological theories of organizational behavior and contemporary issues in micro organizational research. The course emphasizes reading and analysis of primary source material.

ILROB 722 Advanced Macro Organizational Behavior
Fall. 3 credits. Prerequisites: ILROB 520. Staff.
Examines the historical development of sociological theories of organizations and contemporary issues in macro organizational research. The course emphasizes reading and analysis of primary source material.

ILROB 723 Behavioral Research Theory, Strategy, and Methods I
Fall. 4 credits. Designed to meet the needs of M.S. and Ph.D. candidates majoring in organizational behavior, but other graduate students may enroll. Staff.
Materials studied in ILROB 723 and 724 include: theoretical, conceptual, and ethical questions; survey research and attitude-scaling procedures; laboratory research methods; participant observation and interview methods; use of documents and qualitative data analysis. Provides students with important philosophical background for doing research and exposes them to a well-balanced, interdisciplinary set of quantitative and qualitative research tools.

ILROB 724 Behavioral Research Theory, Strategy, and Methods II
Spring. 3 credits. Designed to meet the needs of M.S. and Ph.D. candidates majoring in organizational behavior, but other graduate students may enroll. Staff.
Course covers: analysis and interpretation of quantitative data; traditional problems encountered in the assessment of human and organizational characteristics; the use of different methods of data analysis; and an examination of the limitations imposed on data analysis and interpretation by traditional measures. Examples of topics covered in the course: the use of Chi-square, t-tests, ANOVA, simple and multiple correlation and regression, reliability and validity analyses, causal models, factor analysis, and scale construction.

ILROB 725 Analysis of Published Research in Organizational Behavior (also SOC 725)
Fall. 3 credits. Prerequisites: ILROB 520 and 1 year of statistics. Staff.
An advanced research methods course that critically examines published research papers in the field of organizational behavior in terms of research design and method as well as theory.

ILROB 726 Selected Topics in Organizational Behavior
Fall. 3 credits. Prerequisites: ILROB 520 and permission of instructor.
An advanced proseminar that seeks to develop an interdisciplinary perspective on selected topics in organizational behavior. The topics themselves change from year to year depending on participants' interests. Course is designed to allow students and the instructor to jointly pursue significant scholarly inquiry into one or more arenas of organizational theory. Emphasis is placed on exploring the relevance of tradition in related disciplines (anthropology, linguistics, philosophy, sociology, etc.) that may enrich our understanding of organizational life.

ILROB 727 Work and Industrial Conflict
Spring, weeks 7–14. 2 credits. Staff.
A concentrated examination of the sociology of industrial conflict. The seminar focuses on classic formulations of conflict theory in sociology, then on the social, political, economic causes of industrial conflict. Both individual and collective forms of conflict expression are examined. Some discussion of the implications of various types of worker management of firms for industrial conflict are included.

ILROB 728 Theories of Motivation and Leadership
Spring. 4 credits. Two halves, each lasting 7 weeks. Prerequisite: ILROB 520. Staff.

(1) Theories of Work Motivation.
Course provides an introduction to basic concepts of human motivation in general, with particular emphasis on the theories that explain and predict work motivation. Students examine the empirical research that tests the validity of the theories and shows how and under what conditions different motivation models can be used for practice in work organizations.

(2) Theories of Leadership and Power.
Several current microtheories of leadership and power and related research are examined. The disciplinary perspective employed is social organizational psychology and the level of analysis emphasized is action and experience of individuals in groups.

ILROB 729 Organizational Change and Intervention
Fall. 3 credits. Graduate students only. Staff.
This seminar is concerned with planned and unplanned change in organizations. It is designed to analyze theory in practice. Particular attention is paid to the role of internal and external change agents. Class members are encouraged to analyze contemporary changes such as mergers and acquisitions and work force reductions. Participants submit weekly work force journals.

ILROB 770 The Cultures of Work Organizations
Fall. 3 credits. Open only to graduate students. Staff.
Considers both administrative and occupational cultures in the workplace. The course takes an anthropological perspective, focusing on ideologies as the main ingredient of cultures but emphasizing the role of cultural forms, (myths, stories, sagas, language, rites and ceremonials), and physical settings of meaning. The course pays special attention to the place of subcultures and countercultures in the makeup of administrative culture and to occupations as a major source of subcultures. The role of the environment in which organizations are embedded, and its influence on workplace cultures, is also included. Forms of cultural leadership and approaches to reading and changing cultures are also considered.

ILROB 772 The Social Construction of Economic Life
Spring. 3 credits. M. Lounsbury.
Drawing on the literature in economic sociology, this course emphasizes how economic activities are constituted and shaped by the social, cultural, and historical contexts in which they are situated. This course surveys various empirical and theoretical approaches used to study the genesis and influence of broader scale organizational and institutional arrangements. The course provides students with an opportunity to formulate and refine

their own research questions and perspectives.

ILROB 773 Advanced Seminar in Cross-Cultural Studies of Organizational Behavior
Fall. 3 credits. Permission of the instructor. Staff.
Considers theory and method for the study of cross-cultural and cognitive style variables. Members participate in the conceptualization and conduct of a comparative research project.

ILROB 776 Organizational Implications of World Class Manufacturing
Fall. 4 credits. Staff.
Aimed at helping students develop an understanding of organizations as complex social systems, and at helping students understand the behavioral implications of new manufacturing initiatives. Case studies are used to study the introduction of a variety of innovations in contemporary manufacturing firms, including manufacturing cells and teams, concurrent engineering, total quality management, and just-in-time material flow. Analyses emphasize the impact of such innovations on individuals' role definitions and relationships, organizations' communication requirements and patterns, group dynamics, leadership behaviors, labor relations, and human resource management systems. ILROB 776 is a core course in the Master of Engineering/Manufacturing Option degree program.

ILROB 778 Solidarity in Groups (also SOC)
Fall. 3 credits. E. Lawler.
Examines sociological and social psychological theories about how social solidarity or a "sense of community" comes about and is maintained in groups and organizations. Distinguishes emotional, normative, and instrumental bases for social solidarity and shows how these promote or inhibit subgroup formation in organizations, commitment of individuals to organizations, and organizational citizenship behavior.

ILROB 790 ILR M.P.S. Program
Fall and spring. 1–9 credits.
Supervised research only for those enrolled in the ILR M.P.S. program.

ILROB 798 Internship
For description, see the section, Collective Bargaining, Labor Law, and Labor History.

ILROB 799 Directed Studies
For description, see the section, Collective Bargaining, Labor Law, and Labor History.

ILROB 920 Organizational Behavior Workshop
Fall. 2 credits. Limited to M.S. and Ph.D. candidates in the department. S-U grades only. Staff.
This workshop is designed to provide a forum for the presentation of current research undertaken by faculty members and graduate students in the Department of Organizational Behavior and by invited guests. All M.S. and Ph.D. candidates in the department who are at work on their theses are strongly urged to enroll. Each student in the course is expected to make at least one presentation during the year, focusing on the formulation, design, execution, and results of that students' thesis research.

SOCIAL STATISTICS

T. DiCiccio, chair; J. Angellotti, J. Bunge, A. Hadi, P. Velleman, M. Wells

ILRST 210 Statistical Reasoning I
Fall, spring, and summer 2001–2002. 3 credits. Attendance at weekly discussion section is required. J. Angellotti, P. Velleman.
An introduction to the basic concepts of statistics and data analysis. Descriptive methods, normal theory models, and inference procedures for univariate and bivariate data. Basic statistical designs, an introduction to probability and applications of the Binomial and Normal distributions are covered. Estimation, confidence intervals, and tests of significance for a single population mean and proportion, the difference in two population means and porportions, simple linear regression, correlation, and two-way contingency tables are also considered. Students are instructed on the use of a statistics computer package at the beginning of the term and use it for weekly assignments.

ILRST 211 Statistical Reasoning II
Fall, spring, and summer 2001–2002. 3 credits. Prerequisite: ILRST 210 or suitable introductory statistics course. M. Wells.
A second course in statistics. Applications of statistical data analysis techniques, particularly to the social sciences. Topics include: statistical inference; simple linear regression; multiple linear regression; logistic regression; and analysis of variance. Computer packages are used throughout the course.

ILRST 310 Statistical Sampling
Spring. 3 credits. Prerequisite: 2 terms of statistics. J. Bunge.
Theory and application of statistical sampling, especially in regard to sample design, cost, estimation of population quantities, and error estimation. Assessment of nonsampling errors. Discussion of applications to social and biological sciences and to business problems. Course includes an applied project.

ILRST 311 Practical Matrix Algebra
Fall. 3 credits. J. Bunge.
Matrix algebra is a necessary tool for statistics courses such as regression and multivariate analysis, and for other research methods courses in various other disciplines. One goal of this course is to provide students in various fields of knowledge with a basic understanding of matrix algebra in a language they can easily understand. Topics include special types of matrices; matrix calculations; linear dependence and independence; vector geometry; matrix reduction (trace, determinant, norms); matrix inversion; linear transformation; eigenvalues; matrix decompositions; ellipsoids and distances; and some applications of matrices.

[ILRST 312 Applied Regression Methods
Fall. 3 credits. Prerequisite: ILRST 211 or equivalent courses. Not offered 2001–2002. T. DiCiccio, P. Velleman.
Matrix algebra necessary to analyze regression models is reviewed. Multiple linear regression, analysis of variance, nonlinear regression, and linear logistic regression models are covered. For these models, least squares and maximum likelihood estimation, hypothesis testing, model selection, and diagnostic procedures are considered. Illustrative examples are taken from the social sciences. Computer packages are used.]

[ILRST 313 Design and Analysis of Experiments
Spring. 3 credits. Prerequisite: ILRST 211 or equivalent. Not offered 2001–2002. J. Angellotti.
This course covers the statistical design and analysis of comparative experiments including completely randomized, factorials, randomized block, latin squares, and split-unit designs including crossover and repeated measures. Application of statistical design to research problems is stressed. Analyses to compare treatment groups including ANOVA, ANCOVA, contrasts, and multiple comparison procedures are considered. Computer packages are used.]

[ILRST 314 Graphical Methods for Data Analysis
Spring. 3 credits. Prerequisite: ILRST 211 or equivalent. Not offered 2001–2002. P. Velleman.
Classical and recently developed graphical methods for analysis and display. Characteristics of effective and honest graphs with comparison of alternative methods for understanding data are covered. Includes study of current computer programs and methods expected to be practical in the near future: graphing of univariate data, bivariate plots, multivariate data, graphical methods of data analysis; the specification, modification, and control of graphs; study of interaction between choice of display and underlying patterns.]

[ILRST 315 Statistical Analysis of Legal Data
Fall. 3 credits. Prerequisite: ILRST 211. Not offered 2001–2002. M. Wells.
Presents a survey of the tools from the social and statistical sciences that have been applied to the proof of facts in the courtroom and to the study of questions of legal importance. Reviews various probability models, design issues, and statistical methodologies. The approach taken is based on the determination of the probability of the evidence under two competing hypotheses. Topics include: the role of uncertainty in legal settings; prosecutor's and defender's fallacies; controlled, observational, and epidemiological studies; sampling and surveys; the likelihood ratio approach for evaluation under conflicting hypotheses; p-values and Bayesian assessment; and analysis of various types of transfer evidence, including blood grouping and DNA profiling.]

ILRST 410 Techniques of Multivariate Analysis
Spring. 3 credits. Prerequisite: ILRST 312 or equivalent. P. Velleman.
Techniques of multivariate statistical analysis discussed and illustrated by examples from various fields. The course emphasizes application, but theory is not be ignored. Deviation from assumptions and the rationale for choices among techniques are discussed. Students are expected to learn how to thoroughly analyze real-life data sets using computer-packaged programs. Participants should have some knowledge of matrix notation. Topics include: multivariate normal distribution; sample geometry and multivariate distances; inference about a mean vector; comparison of several multivariate means, variances, and covariances; detection of multivariate outliers; principal component analysis; factor analysis; canonical correlation analysis; discriminant analysis, and multivariate multiple regression.

ILRST 411 Statistical Analysis of Qualitative Data
Fall. 3 credits. Prerequisite: 2 statistics courses or permission of instructor. T. DiCiccio, M. Wells.
An advanced undergraduate and beginning graduate course. Includes treatment of association between qualitative variates; contingency tables; log-linear models; binary ordinal, and multinomial regression models; and limit dependent variables.

ILRST 499 Directed Studies
For description, see the section, Collective Bargaining, Labor Law, and Labor History.

ILRST 510 Statistical Methods for the Social Sciences I
Fall, spring, and summer. 3 credits. J. Angellotti, P. Velleman.
A first course in statistics for graduate students in the social sciences. Descriptive statistics, probability and sampling distributions, estimation, hypothesis testing, simple linear regression and correlation are all covered. Students are instructed on the use of a statistics computer package at the beginning of the term and use it for weekly assignments.

ILRST 511 Statistical Methods for the Social Sciences II
Fall, spring, and summer. 3 credits. Prerequisite: ILRST 510 or equivalent introductory statistics course. J. Bunge, T. DiCiccio, A. Hadi, P. Velleman.
A second course in statistics that emphasizes applications to the social sciences. Topics include: simple linear regression; multiple linear regression (theory, model building, and model diagnostics); and the analysis of variance. Computer packages are used extensively.

[ILRST 610 Seminar in Modern Data Analysis
Fall. 3 credits. Prerequisite: 2 statistics courses or permission of instructor. Not offered 2001–2002. P. Velleman.
An advanced survey of modern data analysis methods. Topics include exploratory data analysis, data re-expression, philosophy of data analysis, robust methods, statistical graphics, regression methods, and diagnostics. Extensive outside readings cover recent and historical work. Participants should have some knowledge of multiple regression, including the use of matrices, and some experience using a computer.]

[ILRST 611 Statistical Computing
3 credits. Prerequisites: linear algebra, knowledge of a programming language, and statistics at least through multiple regression. Not offered 2001–2002. Next offered 2003. Staff.
A survey of new aspects of statistical computing. Topics include: basic numerical methods, numerical linear algebra, nonlinear statistical methods, numerical integration and approximation, smoothing and density estimation. Additional special topics may include Monte Carlo methods, statistical graphics, computing-intensive methods, parallel computation, or computing environments. Designed for graduate students in the statistical sciences and related fields interested in new advances. Students may be asked to write programs in a programming language of their choice.]

ILRST 612 Data Mining
Fall. 3 credits. Prerequisite: ILRST 312 or equivalent, or permission of instructor. J. Bunge.
An introduction to a variety of statistical techniques that assign objects to categories on the basis of observed characteristics of the objects. Course topics include: discriminant analysis and its extensions and variations; nearest neighbor methods, classification and regression trees (CART); neural networks for classification; and estimation of error of classification rules.

[ILRST 613 Bayesian and Conditional Inference
3 credits. Prerequisites: graduate level courses equivalent to OR&IE 670 and OR&IE 651 or permission of instructor. Not offered 2001–2002. Next offered 2003. M. Wells.
Covers the following topics: loss functions and utility theory, prior information and subjective probability, coherency, basic Bayesian inference, empirical Bayesian inference, robust Bayesian inference, Bayesian computations, ancilliarity, conditional properties of statistical procedures, and Barndorff-Nielsen's exact likelihood theory.]

ILRST 614 Structural Equations with Latent Variables
Spring. 3 credits. Prerequisites: ILRST 210, 211 or ILRST 510, 511, or equivalent. T. DiCiccio.
Provides a comprehensive introduction to the general structural equation system, commonly known as the "LISREL model." One purpose of the course is to demonstrate the generality of this model. Rather than treating path analysis, recursive and nonrecursive models, classical econometrics, and confirmatory factor analysis as distinct and unique, this course treats them as special cases of a common model. Another goal of the course is to emphasize the application of these techniques.

[ILRST 615 Expert Systems and Probabilistic Network Models
3 credits. S-U only. Prerequisite: OR&IE 560 or an equivalent course in probability and statistics. Not offered 2001–2002. Next offered 2003. Staff.
This is an interdisciplinary course for students in applied mathematics, computer science, statistics, and other related fields of applications such as medical, engineering, and social sciences. Topics include: components of expert systems, rule-based expert systems, probability-based expert systems, uncertainty measures, dependency models, Bayesian and Markov networks, propagation of uncertainties, learning structure from data, and examples of applications. Students use computer software to gain experience.]

ILRST 619 Special Topics in Social Statistics
Spring. 3 credits. Prerequisite: OR&IE 670 or equivalent. Staff.
Areas of study are determined each semester by the instructor offering the seminar. Topics may include: the multivariate normal and Wishart distributions; multivariate sampling; tests of mean and covariance; multivariate regression; principal components; factor analysis; canonical correlation; robustness; and boostrap confidence regions and tests.

[ILRST 711 Robust Regression Diagnostics
3 credits. S-U or letter grade. Prerequisite: ILRST 312 or equivalent or permission of instructor. Not offered 2001–2002. Next offered 2003. Staff.
Regression models are simplifications of reality; we rarely expect the model to be exactly true. In many applications of regression, however, small changes in a model, a model assumption, or a data point can have very large effects on the results. Regression analysis is viewed in this course as a cyclical process, which takes inputs and produces outputs in an interactive or cyclical way; a way in which the outputs can be used to diagnose, validate, criticize, and possibly alter the inputs. This is an attempt to narrow the gap between the theory and practice of regression analysis. We discuss classical methods as well as a recently developed general framework for assessing the sensitivity of the outputs to small changes in the input. Students are expected to be able to perform thorough analyses of real-life data using computer packages. Topics to be discussed include: role of variables in a regression equation, regression outliers and influential observations, robust regression, alternatives to least squares (e.g., LMS, LAV, IRLS) error-in-variables models, and generalized linear models.]

[ILRST 712 Theory of Sampling
Fall. 3 credits. Prerequisite: calculus and at least 1 semester of mathematical statistics. Not offered 2001–2002. J. Bunge.
Sampling theory from the viewpoint of mathematical statistics. The first part of the course focuses on the classical or "design" approach; the second part on the more recent "model-based" approach. Attention is paid to recent progress in the field.]

[ILRST 713 Counting Processes with Statistical Applications
Spring. 3 credits. Prerequisite: a course at the technical level of Math 572 and 574 or permission of instructor. Not offered 2001–2002. M. Wells.
The statistical analysis of life history data is playing an increasing role in the social, natural, and physical sciences. In this course students formulate and solve various practical problems in the statistical analysis of life history data using the modern theory of stochastic processes. Students examine the martingale dynamics for point processes relevant to life history data. Both parametric and nonparametric inference for multiplicative intensity models are considered. The large sample properties of the proposed procedures are discussed in detail using recent extensions of functional central limit theorems for martingales.]

[ILRST 714 Topics in Modern Statistical Distribution Theory
3 credits. Prerequisites: courses equivalent to OR&IE 651 or Math 571, and STATS 409 or OR&IE 670. Not offered 2001–2002. Staff.
Recent research has revealed vast territories of distribution theory that are unfamiliar to most statisticians. This course provides an introduction to three topics underlining this "modern" theory: infinite divisibility, decomposability, and stability; characterization of distributions; and extensions of univariate distributions to multivariate distributions.]

[ILRST 715 Likelihood Inference
3 credits. Prerequisites: graduate courses equivalent to OR&IE 670 and OR&IE 670. Not offered 2001–2002. Staff.
In most statistical models, exact distribution theory for testing hypotheses or constructing confidence intervals is either unavailable or computationally cumbersome. Inferences are routinely performed by using large-sample approximations to the distributions of test statistics. This course provides a survey of some recent higher-order asymptotic approximations for likelihood-based methods of inference.]

[ILRST 716 Statistical Consulting
2 credits. Prerequisite: limited to graduate students. S-U only. Not offered 2001–2002. Staff.
A course in practical consulting on real-world statistical problems. Under the supervision of the instructor, students hear problems presented by clients (usually faculty and graduate students from other fields) and collaborate in proposing a statistical model, analyzing data, and interpreting results. Statistical computing is used as needed.]

[ILRST 717 The Analysis of Discrete Data
Spring. 3 credits. Prerequisites: graduate courses equivalent to OR&IE 670 or permission of instructor. Not offered 2001–2002. T. DiCiccio.
This course concerns statistical models and methods for analyzing categorical data. The key models to be covered are log-linear models for contingency tables and logistic regression models for binary-response and multinomial data. Asymptotic distribution theory necessary for inference in these models is emphasized. Other topics include conditional inference and connections with generalized linear models. Computer packages are used for analyses in practical examples.]

ILRST 799 Directed Studies
For description, see the section, Collective Bargaining, Labor Law, and Labor History.

ILR EXTENSION

Statewide

The following courses are open to participants in the Extension Division's statewide credit programs in labor studies and management studies. Extension offices are based in Buffalo, Albany, Rochester, Ithaca, New York City, and Long Island. These courses are not open to undergraduate or graduate students matriculated in the Ithaca ILR programs. Courses and course credits earned in Extension Division certificate programs are not automatically accepted as transfer credits or as a basis of admission to the resident ILR undergraduate and graduate programs in Ithaca. Student applications for course transfer are evaluated by the ILR school on an individual basis.

204 Managing Conflict
Fall or spring. 3 credits. Staff.
The purpose of this course is to provide students with opportunities to apply conflict resolution theory to specific situations, based on real-life problems that require resolution. Students will examine situations, analyze the facts and perceptions driving the actors, and engage in applying communication, negotiation, and mediation techniques to reduce or eliminate the conflict.

205 Oral Skills for Conflict Management
Fall or spring. 3 credits. Staff.
This course emphasizes development of oral communications skills required to successfully manage conflict both as a party to a dispute, and as a third party who is charged with helping to resolve a dispute. The course presents simulations to help the participants practice their skills.

206 The Nature of Conflict
Fall or spring. 3 credits. Staff.
The purpose of the course is to provide students with the conceptual foundation to engage in further study of conflict management and conflict resolution. Having taken the course, the students will be able to: identify and describe types of conflict; be able to identify the various sources of conflict; be able to apply a conceptual model of conflict to interpersonal, organizational, and international conflict situations; be able to describe conflict situations in terms of social psychological aspects using a "person perception" or "attribution" theoretical orientation; and be able to identify their personal response styles to conflict.

208 Workplace Negotiations
Fall or spring. 3 credits. Staff.
Covers the theory and practice of negotiation as it applies to workplace and business situations. Students are exposed to theoretical models of negotiation and participate in negotiation exercises. Students participate in two negotiation exercises and are asked to write a paper on their negotiating position in each exercise. More weight is given in grading to the student's ability to present a well-thought-out rationale for positions and tactics than to the outcome of the negotiation itself.

241 Arbitration
3 credits.
A study of the place and function of arbitration in the field of labor-management relations, including an analysis of principles and practices, the law of arbitration, the handling of materials in briefs or oral presentation, the conduct of an arbitration hearing, and the preparation of an arbitration opinion.

242 Public Sector Collective Bargaining
Fall or spring. 3 credits. Staff.
This course is designed as an introduction to collective bargaining in the public sector. The course examines the historical development of bargaining in public employment, the evolution of state and federal and bargaining theory and practices, as well as impasse resolutions techniques frequently found in this sector. Special emphasis is given to developing an understanding of the similarities and differences between public and private sector bargaining and how they have affected tactics and strategies employed by the parties.

243 Growth of American Business and Management History
Fall or spring. 3 credits. Staff.
The growth and cycles of American business enterprise produced significant changes in education, government, work, the family, the ethnic composition of the population, and the landscape. As business and industry expanded, new methods evolved for managing these enterprises. This course examines the development of managerial practices, the relationship of management to the work force, and the social ramifications of capitalist expansion.

245 Public Sector Labor Law
3 credits.
A survey and analysis of the New York State Public Employees Fair Employment Act is made as well as a comparison with other state laws covering public employees. The course examines the extent to which the law protects and regulates concerted actions by employees in the public sector. The intent is to study and understand the law as written, but more importantly to understand how it has been interpreted by the courts of New York State in its application. Major emphasis is in employee and employer rights, including recognition and certification, improper practices, strikes, grievances, and disciplinary procedures of the New York State Public Employment Relations Board.

247 Labor and the American Economy
3 credits.
Helps the student understand how economic theories relate to the economic problems confronting the American citizen in general and the American union member in particular. Emphasis is placed on contemporary economic theories and how their proponents attempt to solve American economic problems.

248 Employment Practices Law
3 credits.
Considers laws and regulations that directly affect managers and employers. Students examine issues and laws such as Equal Employment Opportunity, Employee Retirement Income Security Act, Federal Wage and Hour Laws, Occupational Safety and Health Act, unemployment laws, and other topics. Students focus on the practical application of laws and their impact on the workplace.

250 New York Workers' Compensation Law for Trade Unionists and Injured Workers
Fall or spring. 3 credits. Staff.
There is a collective perception that the Worker's Compensation system in New York compounds an injured personal predicament with Byzantine responses that lead to despair. Unions and injured workers' organizations believe that, if properly empowered, they can be just as effective as lawyers in looking after their injured colleagues' claims. This course is structured to meet both of these realities. Students delve into every nook and cranny of New York Worker's Compensation law. The course is entirely practical. Skills teaching, how to present a case, decorum, ethics, and persuasiveness, are built into the course. Experts on how the system really works are used.

251 Principles and Practices of Management
Fall or spring. 3 credits. Staff.
Presents the theory and processes of management with an emphasis on supervision. Management functions of planning, organizing, staffing, and evaluating are included. Concepts and theories are presented, and case studies are analyzed. Motivating people, exercising leadership, and effectively developing employees are emphasized.

252 Contract Bargaining
Fall or spring. 3 credits. Staff.
Examines the principles of contract bargaining, including bargaining environments and structures as well as standards used in

bargaining. Students learn to prepare bargaining demands, cost economic items, draft noneconomic contract language, negotiate economic and noneconomic issues, and resolve a contract bargaining impasse. The course considers the impact of contract bargaining outcomes on workers, unions, employers, and the public.

253 Contract Administration
Fall or spring. 3 credits. Staff.
Focuses on the role of the steward in administering the union contract in the workplace. Students evaluate grievance and arbitration contract clauses, the grievance procedure in practice, the role of the union steward, the role of local and international unions, negotiation of grievances, and preparation for arbitration. Students analyze the impact of grievance and arbitration procedures on workers, unions, and employers.

254 Labor Law
Fall or spring. 3 credits. Staff.
Examines the principles of labor law by looking at social philosophy and the historical context of federal labor legislation from the 1930s. Students concentrate on major provisions of the National Labor Relations Act, examining how the National Labor Relations Board and the federal courts have interpreted the national labor laws. Discussion includes new directions in labor legislation and interpretation with consideration given to the impact of labor law on workers, unions, and employers.

255 Labor History
Fall or spring. 3 credits. Staff.
Reviews American labor history from the perspective of workers' social dimensions of the development of the working class, reform and revolutionary movements, and the emergence of craft, industrial, and public employee unions. Included is a discussion of the development of trade union institutions and leaders, and the evolution of union political activities and collective bargaining. Special attention is paid to the involvement of women and minority workers with unions.

256 Dispute Resolution
Fall or spring. 3 credits. Staff.
Examines third-party participation in dispute resolution in private and public sector collective bargaining. Development of dispute resolution methods in American labor relations; issues and practices in neutral, binding arbitration of grievances and mediation; conciliation; and fact finding procedures are discussed. Use of exclusive labor-management mechanisms to settle industry disputes is also looked at.

257 Human Resource Administration
Fall or spring. 3 credits. Staff.
Designed to provide an overview of personnel practices in the modern organization. The course focuses on manpower planning, employment, training and development, motivation and compensation, and performance appraisal and communication for students who are currently supervisors or personnel practitioners or for those aspiring to those positions.

258 Organizational Behavior
Fall or spring. 3 credits. Staff.
Designed to illustrate how behavioral science theory leads to research and how theory and research provide a basis for practical application in business, industry, education, and government.

259 Union Administration
Fall or spring. 3 credits. Staff.
Focus is on the principles and practices of effective union administration. Students study the dynamics of democratic organizations and the development of organizational leadership. The course explores alternative methods of decision making and lines of responsibility. The legal obligations of unions and union officials is discussed and analyzed. The course also examines the structure and evolution of relationships inside the labor movement.

262 Project Management
Fall or spring. 3 credits. Staff.
Through the process of restructuring, many companies are "flattening out" the hierarchy of management levels. This means that more responsibilities are shifting downward to employees who may not have the status (authority) of supervisor or manager, but who have the enormous responsibility of completing complex, critical projects within well-defined business constraints. In response to the shift in responsibility downward and with much more to be accomplished with limited resources, the demands for employees with effective project management skills are increasing. Employees who can successfully manage projects are and will continue to be the most marketable individuals in the work force because their skills are transferable to all disciplines, organizations, and situations.

264 Contemporary Labor Problems
Fall or spring. 3 credits. Staff.
A survey of the major challenges that confront the American labor movement. Students are briefed on the background of each problem and discuss and analyze a broad range of solutions proposed by the experts.

266 Professional Writing: The Power of the Written Word in Business
3 credits.
Focuses on the importance of developing effective writing skills and strategies required to be successful in business communities. Students sharpen existing writing skills, correct bad writing habits, and develop new writing habits through "real life" exercises taken from case studies and their own experiences. In addition, students learn the importance of using rhetorical strategies such as defining situations requiring written responses, writing to a specific audience, attending to a specific purpose, choosing the appropriate language, and varying tone and style as the situation demands. Students, upon completing this course, have the confidence and the writing skills to successfully address most situations requiring written communication. Genres include memos, proposal letters, and reports.

267 Speaking and Listening for Business and the Professions
3 credits.
The overall objective is to equip participants with the skills and knowledge they need to speak and listen effectively. By the end of the course, students are able to accurately listen to, and interpret oral communication; identify major causes of listening misunderstandings such as biases, distractions, emotions, etc.; describe and employ techniques for overcoming those listening barriers; speak effectively in front of an audience; describe ways to build rapport with an audience; persuade an audience; use visual aids effectively; introduce speakers, make presentations, and speak extemporaneously.

269 The Evolution of Work in America
Fall or spring. 3 credits. Staff.
Explores the evolution of contemporary business operations. Discussion focuses on historical and present-day theories of work organization, changes in the workplace and workforce, and future trends. The relationships between businesses and the societies in which they exist, in both local and global economies, are also examined.

343 Health in the Workplace
Fall or spring. 3 credits. Staff.
Examines the state and federal laws that affect job safety, and health, and the way workers and their unions can use legislation to promote safe and healthy working conditions. Topics include safety and health standards; the enforcement of laws and standards; the responsibilities of management; the rights of employees and their unions, including rights to information; collective bargaining for safety and health; racial- and gender-based discrimination regarding hazardous work; and drug testing.

344 Union Strategies for Safety and Health
Fall or spring. 3 credits. Staff.
Even with OSHA, the most effective tool for change in the unionized work environment remains the collective bargaining process and collective action. This course explores specific strategies for making the workplace safer through collective bargaining, workers education, safety and health committees, joint labor-management committees, working with COSH groups, union-sponsored medical exams at occupational health clinics, and the OSHA complaint process. Case studies consider integration of occupational health initiatives into broader union strategies such as organizing drives and industrial development planning.

345 Health Hazards Identification and Evaluation in the Workplace
Fall or spring. 3 credits. Staff.
Students learn about the many work site health hazards including toxic chemicals, biological agents, radiation, and electromagnetic fields. Routes of exposure, acute and chronic health effects, and the bases of regulatory exposure limits such as TLV's and OSHA PEL's are discussed. Basic hazard evaluation and information gathering techniques familiarize students with available resources for evaluating work site conditions.

346 Introduction to Industrial Hygiene: Hazard Evaluation and Control
Fall or spring. 3 credits. Staff.
This course builds on the knowledge acquired in both the safety hazard and health hazard courses to provide students with greater mastery of hazard evaluation and control methods. (Students are encouraged to complete the health hazard and safety hazard courses before taking industrial hygiene.) The course provides practical, hands-on training in evaluating potential worksite hazards. Students learn about environmental monitoring methods such as air sampling and become familiar with the commonly used equipment.

They also learn to interpret and evaluate monitoring data provided by professional testers.

347 Safety Hazards Identification and Evaluation in the Workplace
Fall or spring. 3 credits.
Safety hazards (as opposed to health hazards) generally involve harm of an immediate and sometimes violent nature; health effects include burns, electrical shock, broken bones, and the loss of limbs, eyesight, or hearing. With chemicals, the primary concern is their explosive, reactive, or flammable nature rather than with the toxic effects that are the focus of health hazard evaluation. Students become familiar with site inspection and hazard identification methods and learn about control techniques appropriate for a variety of work settings.

364 Labor, Government, and Politics
3 credits.
A survey of the ways the American political system affects labor and how organized labor affects the system through voting, political parties, and interest groups.

367 Safety and Health in the Workplace
Fall or spring. 3 credits. Staff.
This course provides basic education and training in workplace safety and health. The course focuses on applicable federal and state laws, standards for safety and health, industrial hygiene, and such health concerns as asbestos, radon, and AIDS. Practical experience is provided through workplace walk-through safety and health inspections and in use of industrial hygiene equipment to measure noise, temperature, humidity, airflow, and airborne toxins.

FACULTY ROSTER

Abowd, John M., Ph.D., U. of Chicago. Prof., Labor Economics
Angellotti, Jon E., M.S. candidate, Cornell U. Lecturer, Social Statistics
Bacharach, Samuel, Ph.D., U. of Wisconsin. Jean McKelvey-Alice Grant Prof. of Labor Management Relations, Organizational Behavior
Batt, Rosemary, Ph.D., Mass. Inst. of Technology. Asst. Prof., Human Resource Studies
Bishop, John H., Ph.D., U. of Michigan. Assoc. Prof., Human Resource Studies
Blau, Francine D., Ph.D., Harvard U. Francis Perkins Prof. of Industrial and Labor Relations, Labor Economics
Boudreau, John W., Ph.D., Purdue U. Assoc. Prof., Human Resource Studies
Boyer, George R., Ph.D., U. of Wisconsin. Prof., Labor Economics
Briggs, Vernon M., Jr., Ph.D., Michigan State U. Prof., Human Resource Studies
Bunge, John A., Ph.D., Ohio State U. Assoc. Prof., Social Statistics
Cavanaugh, Marci A., U. of Minnesota. Asst. Prof., Human Resource Studies
Collins, Christopher, Ph.D., U. of Maryland. Asst. Prof., Human Resource Studies
Compa, Lance, J.D., Yale Law School. Sr. Lecturer, Collective Bargaining, Labor Law, and Labor History
Cook, Maria L., Ph.D., Univ. of Calif., Berkeley. Assoc. Prof., Collective Bargaining, Labor Law, and Labor History
Cowie, Jefferson R., Ph.D., U. of North Carolina—Chapel Hill. Visiting Asst. Prof., Collective Bargaining Labor Law and Labor History
Daniel, Cletus E., Ph.D., U. of Washington. Prof., Collective Bargaining, Labor Law, and Labor History
DeVault, Ileen A., Ph.D., Yale U. Assoc. Prof., Collective Bargaining, Labor Law, and Labor History
DiCiccio, Thomas J., Ph.D., U. of Waterloo. Assoc. Prof., Social Statistics
Dyer, Lee D., Ph.D., U. of Wisconsin. Prof., Human Resource Studies
Ehrenberg, Ronald, Ph.D., Northwestern U. Irving M. Ives Professor of Industrial and Labor Relations and Economics, Labor Economics
Farley, Jennie T., Ph.D., Cornell U. Prof., Extension
Fields, Gary S., Ph.D., U. of Michigan. Prof., Labor Economics
Gold, Michael E., LL.B., Stanford U. Assoc. Prof. Collective Bargaining, Labor Law, and Labor History
Gross, James A., Ph.D., U. of Wisconsin. Prof., Collective Bargaining, Labor Law, and Labor History
Hadi, Ali S., Ph.D., New York U. Prof., Social Statistics
Hammer, Tove H., Ph.D., U. of Maryland. Prof., Organizational Behavior
Homrighouse, Christina, B.S., Ithaca College. Lecturer, Human Resource Studies
Hurd, Richard W., Ph.D., Vanderbilt U. Prof., Extension and Public Service
Hutchens, Robert M., Ph.D., U. of Wisconsin. Prof., Labor Economics
Jakubson, George H., Ph.D., U. of Wisconsin. Assoc. Prof., Labor Economics
Kahn, Lawrence M., Ph.D., U. of Calif. at Berkeley. Prof., Collective Bargaining, Labor Law, and Labor History/Labor Economics
Katz, Harry C., Ph.D., U. of California at Berkeley. Jack Sheinkman Prof. in Collective Bargaining, Labor Law, and Labor History
Kuruvilla, Sarosh C., Ph.D., U. of Iowa. Assoc. Prof., Collective Bargaining, Labor Law, and Labor History
Lawler, Edward J., Ph.D., U. of Wisconsin at Madison. Prof., Organizational Behavior
Lieberwitz, Risa L., J. D., U. of Florida. Assoc. Prof., Collective Bargaining, Labor Law, and Labor History
Lipsky, David B., Ph.D., Massachusetts Inst. of Technology. Prof., Collective Bargaining, Labor Law, and Labor History
Lounsbury, Michael, Ph.D., Northwestern U. Asst. Prof., Organizational Behavior
Milkovich, George, Ph.D., U. of Minnesota. Martin P. Catherwood Professor of Industrial and Labor Relations, Human Resource Studies
Roberson, Quinetta, Ph.D., U. of Maryland. Asst. Prof., Human Resource Studies
Salvatore, Nicholas, Ph.D., U. of California at Berkeley. Prof., Collective Bargaining, Labor Law, and Labor History
Seeber, Ronald L., Ph.D., U. of Illinois. Assoc. Prof., Extension
Smith, Robert S., Ph.D., Stanford U. Prof., Labor Economics
Sonnenstuhl, William J., Ph.D., New York U. Assoc. Prof., Extension and Organizational Behavior
Stern, Robert N., Ph.D., Vanderbilt U. Prof., Organizational Behavior
Stone, Katherine J. D., Harvard U. Anne Evans Estabrook Prof. in Dispute Resolution, Collective Bargaining, Labor Law and Labor History
Tolbert, Pamela S., Ph.D., U. of California. Prof., Organizational Behavior
Turner, Lowell R., Ph.D., U. of California. Prof., Collective Bargaining, Labor Law and Labor History/International and Comparative Labor Relations
Velleman, Paul F., Ph.D., Princeton U. Assoc. Prof., Social Statistics
Wells, Martin T., Ph.D., U. of California at Santa Barbara. Prof., Social Statistics
Wright, Patrick M., Ph.D., Michigan State U. Prof., Human Resource Studies

JOHNSON GRADUATE SCHOOL OF MANAGEMENT

ADMINISTRATION

Robert J. Swieringa, dean

John A. Elliott, associate dean for academic affairs

Michael J. Hostetler, associate dean for executive education

Thomas B. Hambury, director of EMBA Program

Cathy S. Dove, associate dean for MBA Program and operations

Richard A. Shafer, associate dean for corporate relations

Rosalyn A. Hines, executive director of development

Natalie M. Grinblatt, director of admissions

John D. Nozell, director of career services

Harriet Peters, director of advising and student activities

Sherry L. Canger, assistant to the dean

Ann W. Richards, financial aid director and associate director of admissions

Janet S. Gray, registrar and associate director for MBA Program

The Johnson Graduate School of Management prepares men and women for managerial careers in business. The school offers course work in many disciplines to provide potential managers with an understanding of the complexities of the professional world in which they will operate and of the organizations of which they will become a part.

A bachelor's degree or its equivalent is required for admission to the two-year program leading to the Master of Business Administration (M.B.A.) degree. Nearly half of the students have a background of undergraduate studies in arts and sciences, and about one-quarter in engineering. Five percent of the students begin their graduate training immediately after receiving their bachelor's degrees and the remaining 95 percent following work experience.

Combined degree programs allow highly qualified Cornell students to co-register in the school during their senior year, thereby earning a master's degree in less than the usual time.

The doctoral program, administered through the Graduate School, provides an advanced level of education in business for those who seek careers in teaching and research at leading universities.

More detailed information about these programs is available from the Office of Admissions and Student Affairs, Johnson Graduate School of Management, Room 111 Sage Hall.

Students in other graduate programs and undergraduate students registered with the university are welcome in many classes. Since matriculated MBA students require certain courses for graduation, non-Johnson School students are not allowed to pre-enroll. During the first week of classes, registration of non-Johnson School students occurs on a space available basis.

UNDERGRADUATE ONLY

NBA 300 Entrepreneurship and Enterprise
Fall, spring. 3 credits. D. BenDaniel.
The course uses Cornell-developed case studies and lectures to address entrepreneurial management in start-up ventures and new-business development in existing companies. Among the topics covered are valuation of business, planning, obtaining resources, management of growth, and cashing out. Guest lecturers speak on specialized topics such as corporate and patent law, bankruptcy and workouts, leveraged buy-outs, and valuations of businesses. Students team up to write and present business plans. The course attempts to integrate marketing, finance, operations, and human-resource topics in the context of high-growth business ventures. For non-Johnson School students only. Johnson School students see NBA 564.

NBA 401 Entrepreneurship for Scientists and Engineers
Fall, spring. 3 credits. J. Nesheim.
This course is intended to introduce students to the new business startup process. Small teams will be formed to come up with an idea for a startup and create a business plan that can attract venture capital or other funding for the new enterprise. Guest lecturers are from successful high-technology companies. The course is led by instructors from Silicon Valley and Ithaca who created high-technology businesses.

COURSES FOR NON-JOHNSON SCHOOL STUDENTS

NCC 550 Financial Accounting
Fall, spring. 3 credits. Course intended for non-Johnson School students only. Staff.
An introductory accounting course that examines the subject from the viewpoint of users external to the organization. Topics include transaction analysis; the accounting cycle; financial-statement preparation, use, and analysis; revenue recognition and cost measurement; present value; and problems in financial-accounting disclosure. This course is similar in content to the MBA core course NCC 500.

NCC 553 Marketing Management
Fall, spring. 3 credits. Course intended for non–Johnson School students only. Staff.
The course addresses controllable and uncontrollable marketing variables that managers in multi-product firms face in today's business environment. Topics include customer behavior, product planning, distribution, advertising and promotion, pricing, and competitive strategy. This course is similar in content to the MBA core course NCC 503.

NCC 554 Management and Organizations
Fall. 3 credits. Course intended for non–Johnson School students only. Staff.
This course takes a resource-based approach to management by arguing that organizations should link their strategy to their internal resources and capabilities. This theme is developed by addressing: (1) the strategic value of internal resources and capabilities; (2) the role of human resources and organizational behavior in formulating and implementing strategy; and (3) the importance of structure and the design of organizations in formulating and implementing strategy. Included among the topics are: how firms create sustainable competitive advantage through internal resources and capabilities; what the best practices are for managing people; what effects best practices have on attitudes and behaviors; why putting the customer first is not necessarily best practice from a resource-based perspective; why organizational culture is central to organizational effectiveness; why the formal organizational chart and structure of an organization are important; how organizations innovate; how organizations change through re-architecture and re-engineering; what firms gain and lose through pursuing core competencies; and what firms gain through strategic alliances and networks. The course makes extensive use of case materials. This course is similar in content to the MBA core course NCC 504.

NCC 556 Managerial Finance
Fall, spring. 3 credits. Course intended for non–Johnson School students only. Staff.
An introduction to business finance through theory and case studies. Topics include stock and bond valuation, the capital-budgeting decision, portfolio theory, the asset-pricing models, raising capital, capital structure, mergers and acquisitions, costs of capital, option pricing, and risk management. International applications are considered within each topic area. Letter grade only, based on exam, group case reports, homework and class participation. This course is similar in content to the MBA core course NCC 506.

NCC 558 Production and Operations Management
Spring. 3 credits. Course intended for non–Johnson School students only. Prerequisites: NCC 501 or permission of the instructor. Staff.
Operations management deals with the problems of producing and delivering goods and services, topics that are of strategic importance in almost every organization. Production scheduling is a significant problem for manufacturing firms; smooth work flow and quality control are important in banking operations; inventory control is crucial in large retail establishments; and proper task sequencing is a major problem in the construction industry. The course deals with these problems and others from a managerial

viewpoint. The course is designed around managerial problems in the operations area. Students use case studies to improve skills in problem identification. This course is similar in content to the MBA core course NCC 508.

NBA 553 Accounting and Finance for Engineers
Spring. 3 credits. Course intended for non-Johnson School students only. R. Hilton. This course focuses on basic financial and managerial accounting and the economic and financial concepts that have a bearing on managerial decisions. The goals of the course are: (1) to give students a working knowledge of the accounting process and the value and limitations of the data that comes out of the accounting information system; (2) to familiarize students with key concepts in managerial accounting and the application of cost information to pricing and operating decisions; (3) and to promote an understanding of the use of economic theory in the evaluation of capital investment projects. The teaching methods consist of lectures and cases. Students are evaluated on the basis of exams.

IMMERSIONS

Only at the Johnson School will you find learning immersion courses in manufacturing, managerial finance, investment banking, brand management, and e-business. Immersions offer a semester of continuous focus, real-world problem solving, and site visits to dozens of companies.

MFI —Managerial Finance Immersion

This is a unique immersion course specifically designed for students planning to pursue finance careers. Some students interested in non-finance careers (including consulting) may wish to consider this course, but they should recognize that it is not specifically designed for this purpose. A major objective of this course is to help students make more informed choices about how to launch their finance careers.

NBA 502 Managerial Cost Accounting
3.0 credits.

NBA 549 Managerial Finance—Practicum
2.5 credits.

NBA 506 Financial Statement Analysis
1.5 credits.

NBA 565 Corporate Financial Policy
1.5 credits.

NBA 656 Valuation Principles
1.5 credits.

NCC 508 Managing Operations
2.5 credits.

NCC 509 Strategy
2.5 credits

IBI —Investment Banking Immersion

This course is specifically designed for those students planning to pursue careers in investment banking. The course is inappropriate for students interested in following a finance career in non-financial industry or non-finance careers (including consulting). This course is designed to meld the practical and the theoretical aspects of the field. We will be expecting a great deal of interaction and discussion between students, the participating faculty, and visiting practitioners. While the course is designed to make its students more attractive as candidates for employment in the investment banking profession, and we expect that some of the participating firms will be using their visits to identify candidates for summer internships, obtaining relevant summer internships remains the responsibility of the students. Prerequisite: NCC 506.

NBA 500 Intermediate Accounting
3.0 credits.

NBA 556 Investment Banking—Practicum
2.5 credits.

NBA 506 Financial Statement Analysis
1.5 credits.

NBA 511 Financial Modeling
1.5 credits.

NCC 508 Managing Operations
2.5 credits.

NCC 509 Strategy
2.5 credits.

NBA 656 Valuation Principles
1.5 credits.

SBM —Immersion in Brand Management

This is a full-time program for the semester; students will not be able to take other courses concurrently. The course objective is to begin developing students to think and act like brand managers, some of the best trained and most upwardly mobile professionals in industry. It will provide students with a unique opportunity to begin internalizing the concepts, principles, and tools necessary to achieve success in brand management. While the course focuses on managing traditional consumer brands, high tech products, services, and global branding will also be addressed. In-class methods consist of: (1) academic and industry lecturers; (2) on-site visits with marketing and manufacturing professionals; (3) case and project discussions and presentations; and (4) a brand management simulation. Course requirements consist of: (1) discussion of readings; (2) individual case write-ups and presentations; (3) group projects and presentations (including a capstone simulation); and (4) in-class exams. There will be considerable off-campus travel for field study. Prerequisites: NCC 500, 501, 502, 503, and 506. Restricted enrollment—permission of the instructor required.

NBA 624 Brand Management—Practicum
4.0 credits.

NBA 502 Managerial Cost Accounting
3.0 credits.

NBA 620 Marketing Researching
3.0 credits.

NCC 508 Managing Operations
2.5 credits.

NCC 509 Strategy
2.5 credits.

SIM—Semester in Manufacturing

This is a full-time program for the semester; students cannot take other courses concurrently. The course is concerned with the integration of technological, human-resource, logistical, and financial considerations to produce a manufacturing enterprise that can respond quickly and effectively to market requirements. The class is taught by a team of faculty and industrial practitioners, and much of the student work is team-oriented. There is off-campus travel for field study of various manufacturing plants. Johnson School students should complete NCC 501 and NCC 506 before taking this course. Enrollment limited; permission of instructor required.

NBA 650 Semester in Manufacturing Practicum
10 credits.

NCC 508 Managing Operations
2.5 credits.

NCC 509 Strategy
2.5 credits.

EBI—Electronic Business Immersion

The new E-Business Immersion is unusual in that it is a joint undertaking of the Johnson School and Cornell's Faculty of Computing and Information Science (CIS). Three faculty members from CIS will participate in teaching the course, providing state-of-the-art background in Internet infrastructure and technology. EBI project work will be done by mixed teams of MBA and computer science graduate students. The computer science students will learn about business models and strategy; the MBA students will get a direct understanding of the limited and potential of technology, and both will learn from the approach and perspectives of the other.

The E-Business Immersion is also unusual in that it has a corporate sponsor and partner. Corning Inc., a world leaders in fiber, cable, and photonics, will supply speakers and open its nearby facilities to site visits. In addition, the EBI project teams will join existing projects in various Corning divisions. Corning staff will be invited to attend and participate in EBI classes.

E-business, of course, is a field that has experienced unprecedented growth and, recently, attrition. The immersion will examine the rapid rise and fall of the early phases of the Internet economy and look for patterns and lessons. If the first round of pure-play B2C is somewhat tarnished, there is no doubt that multi-channel B2C activity will become vitally important in many industries. Customized manufacturing will be a significant part of this—a topic that EBI will explore jointly with the Semester in Manufacturing. Also joint with SiM will be examination of procurement and supply-chain coordination. EBI will also assess the next generation of applications that can be supported by wireless, networked Internet appliances.

EBI seeks to prepare students to deal with a world of infinite bandwidth, unlimited storage, and universal wireless connectivity. It will examine the fundamental underlying issues of intellectual property protection, privacy and security, and the challenging economics of zero-marginal-cost goods. It will identify and distinguish the four different levels of

e-business problems: strategy, tactical design, implementation, and execution.

The Internet is inexorably transforming the way the world does business. Cornell's E-Business Immersion is an appropriately innovate way to address preparation for participation in this revolution.

NBA 508 Managing Operations
2.5 credits.

NBA 509 Strategy
2.5 credits.

NBA 613 E-Business Practicum
10 credits.

NCC COMMON CORE COURSES

NCC 500 Financial Accounting
Fall. 2.5 credits. Johnson School core course. Enrollment limited. J. D'Souza, R. Libby.
An introductory accounting course that examines the subject from the viewpoint of users external to the organization. Topics include transaction analysis; the accounting cycle; financial-statement preparation, use, and analysis; revenue recognition and cost measurement; present value; and problems in financial-accounting disclosure.

NCC 501 Statistics for Management
Fall. 2.5 credits. Johnson School core course. Enrollment limited. J. McClain, J. Thomas.
An introduction to decision making under conditions of uncertainty. Topics include descriptive statistics, probability theory, classical statistics, statistical decision theory, and simple and multiple regression analysis. Applications in finance, marketing, and operations management are discussed.

NCC 502 Microeconomics for Management
Fall. 2.5 credits. Johnson School core course. Enrollment limited. M. Waldman.
Microeconomic theory is introduced and applied to problems faced by managers. Specific topics covered include supply and demand, consumer behavior, pricing when a firm has market power, and the role of contracts. The class employs a lecture format and emphasizes problem solving. Grading is based on a midterm and a final exam.

NCC 503 Marketing Management
Fall. 2.5 credits. Johnson School core course. Enrollment limited. D. Stayman.
The course is designed to convey the key concepts of marketing and how they fit into the larger context of management strategy and decisions. Both the practical "how" and the fundamental "why" of marketing activities are presented in the light of contributions from behavioral science, economics, and statistics. The goals are to provide sufficient understanding for those who will need only to interact with the marketing function, as well as communication concepts and developing processes that can provide the foundation for further course work and future experience in marketing. The course makes extensive use of case materials.

NCC 504 Management and Organizations
Fall. 2.5 credits. Johnson School core course. Enrollment limited. D. Sally.
If you think about it, stories are central to how we know and remember events, people, and facts, and to how we communicate knowledge and history. Most of the jobs you aspire to involve a particular form of story-telling—the CEO's vision, the analyst's report, the planner's strategy, the salesperson's pitch, the consultant's analysis, and the manager's brand. What distinguishes these as business stories is that they are often analytical (based on a set of objective facts and statistics) and reflect a deep understanding of the complex interactions of individuals and organizations. This course has two goals: (1) to make you appreciate the complexity of the issues that often arise in organizations, and (2) to develop and refine your analytical story-telling abilities. To achieve these goals, the course will be taught by the case-study method. Cases are an efficient way to expand your experience base with respect to such issues as motivation, power, leadership, ethics, structure, design, and change. We hope to teach you how to make good inferences about what will and won't work in particular situations, and how to learn from your own experiences and those of others.

NCC 506 Managerial Finance
Fall. 2.5 credits. Johnson School core course. Enrollment limited. R. Michaely.
The course objective is to introduce students to the basic concepts of finance. In particular, we address the issue of what type of investments should firms and individuals take on, and how these investments should be financed. Understanding these concepts are essential to financial managers and professional investors, and has important applications to many aspects of financial decisions all of us have to make on a daily basis (e.g., is getting a MBA a good investment?). These issues involve capital budgeting decisions, stock and bond valuation, how to assess and account for risk through the capital asset pricing model (CAPM), option pricing, capital structure and cost of capital, and market efficiency. Letter grade only, based on examinations, quizzes, group case reports, homework, and class participation.

NCC 508 Managing Operations
Spring. 2.5 credits. Johnson School core course. Enrollment limited. Prerequisite: NCC 501 or permission of instructor. M. Lojo, L. Robinson.
This course focuses on managing processes: actions that convert inputs into outputs. Almost any business function can be modeled as a network of processes. The first part of the course examines processes, both individually and as part of a larger system; we see that good process design reflects both the volume and the variety of the product. A common course theme is the deleterious effect of variability (in demand, supply, quality, or capacity) in complex systems. Queuing theory and simulation are particularly helpful for analyzing process capabilities. The second part of the course analyzes how goods and services are produced. After describing the strategic role of operations, we examine forecasting systems, inventory management, and just-in-time and logistic management. Constrained optimization models provide information about managing with finite resources. The final part of the course examines process improvement through quality and productivity management and corporate learning.

NCC 509 Strategy
Spring. 2.5 credits. Johnson School core course. Enrollment limited. V. Kadiyali.
Among the critical tasks facing any senior manager are the creation, implementation, and evaluation of a business unit's strategy. This course seeks to provide the management student with the tools and frameworks essential to carrying out these tasks. Many of these tools and frameworks are based on recent advances in game theory, industrial organization, and organization theory, although the course also draws from the older business policy tradition as well. Students who successfully complete this course will be able to analyze industries, identify areas of strategy advantage and disadvantage, and to devise strategies that exploit advantages and remedy disadvantages.

NBA MANAGEMENT ELECTIVE COURSES

Accounting

NBA 500 Intermediate Accounting
Fall, spring. 3 credits. Prerequisite: NCC 500 or the equivalent. T. Dyckman.
The course is based on the essential concepts and terminologies of financial accounting introduced in the accounting core course. Students learn to evaluate financial statements through the use of case studies drawn from actual corporate financial reports.

NBA 501 Accounting for Mergers and Consolidations
Spring. 1.5 credits. Prerequisite: NBA 500 or permission of the instructor. R. Libby.
The course focuses on accounting problems related to equity financing, including leveraged restructuring, intercorporate investments, leveraged buyouts, consolidated reports, proforma statements for a merger prospectus, and other related financial reporting problems. The method of instruction is lecture mixed with cases. Grading is based on two closed book exams. Course continues in NBA 508, Advanced Accounting, offered second half of semester.

NBA 502 Managerial Cost Accounting
Fall, spring. 3 credits. Prerequisites: NCC 500, NCC 501, and NCC 502, or the equivalent. R. Hilton.
The course is designed both for those responsible for internal accounting information and those who use such information for decision making. Topics include budgeting, accumulating costs for product costing, activity-based costing, standard costs, the analysis of cost variances, cost estimation and prediction, cost-price-volume decisions, performance measurement, nonmanufacturing cost analysis, cost allocation, and transfer pricing. Instruction will be a mixture of lecture and case discussion. Student evaluation will be based on a midterm exam, a final exam, a project, and class participation.

NBA 503 Strategic Cost Management
1.5 credits. R. Hilton.
This course focuses on the role of cost management and related issues in helping a firm compete successfully in the global market. Topics considered include activity-based costing, activity-based management, value chain analysis, the lean enterprise,

confronting competition in an industry dominated by lean enterprises, re-engineering, process value analysis, identification of nonvalue-added activities and costs, target costing, Kaizen costing, continuous improvement, time-based competition, cost versus quality, and benchmarking. The course is almost entirely based on cases, many of them lean enterprises in Japan.

NBA 504 Taxation Affecting Business and Personal Decision Making
Spring. 1.5 credits. Prerequisite: NCC 500 or permission of the instructor. R. Bloomfield.
This course introduces students to the fundamental concepts and techniques of tax planning for individuals and businesses. Planning opportunities considered include changing the timing and nature of income, investments, and expenses; choosing an organizational form; and constructing transactions that allow two or more parties to engage in tax arbitrage. The course also introduces tax research techniques and issues regarding tax compliance. Course continues with NBA 507.

NBA 505 Auditing
Spring. 3 credits. Prerequisite: NCC 500 or permission of the instructor. M. Nelson.
The course examines the process by which financial-accounting systems are audited. Topics include ethics, the meaning of audit reports, the legal liability of auditors, the study and evaluation of internal control systems, and various approaches for testing account balances. Problems, cases, and video simulations are used to illustrate concepts.

NBA 506 Financial Statement Analysis
Spring. 1.5 credits. Prerequisite: NCC 506, NBA 500 (or concurrent enrollment) or permission of the instructor. S. Bhorjraj.
This course develops a set of core skills essential to financial statement analysis. We will cover strategic ratio analysis, cash flow analysis, pro forma financial statements, financial modeling, credit analysis, bond rating and bankruptcy predictions, and firm valuation using discounted cash flow techniques. Emphasis is on practical applications. The course format is a combination of case studies and lectures. The lectures communicate subtler aspects of the material while the cases provide hands-on experience. There will be an exam.

Note: Students who have completed the three-credit version of NBA 506 cannot enroll in this course.

NBA 507 Tax Implication of Mergers and Acquisitions and Other Special Topics
Spring. 1.5 credits. Prerequisite: NBA 504 or permission of instructor. R. Bloomfield.
This course examines special topics in tax planning for businesses, with particular emphasis on capital structure choices and reorganizations (mergers and acquisitions), and intra-entity transactions (transfer pricing issues). Readings include many current research papers examining how large corporations exploit their tax planning opportunities.

NBA 508 Advanced and International Accounting
Spring. 1.5 credits. Prerequisites: NBA 501 or permission of the instructor. J. D'Souza.
The course examines advanced topics in accounting for international transactions and international subsidiaries, including foreign currency translation, price level adjustments and international variation in accounting principles. The method of instruction is lectures mixed with cases. Grading is based on two exams and some written cases. Continuation of NBA 501, Accounting for Mergers & Consol (offered first half of semester).

NBA 509 Advanced Financial Analysis
Fall. 1.5 credits. Prerequisites: NBA 506, a finance immersion course, or permission of the instructor. S. Bhorjraj.
This course builds on the core financial analysis skills developed in NBA 506. Topics covered include equity valuation, residual income models, quality of earnings assessments, earnings manipulation detection, market efficiency issues, fairness opinions in MBO's, and large sample stock screening strategies. The overall focus is on using accounting-based information to make investment decisions. Emphasis is on practical applications and special attention is given to cultivating analytical and communication skills. The course features both lectures and cases. There will be a group term project, but no final exam.

Note: Students who have completed the three-credit version of NBA 506 cannot enroll in this course.

NBA 510 Cornell Equity Research
Fall, spring. 1.5 credits. Prerequisites: NCC 500 and completion of or concurrent enrollment in NBA 506, or permission of the instructor. R. Bloomfield.
Students write and revise equity research reports on companies that are neglected by analysts and preferably undervalued. Class work includes lectures and cases on equity research and valuation, presentations by guest visitors, and presentations by students who must persuade the class to approve their stock recommendations.

NBA 511 Financial Modeling
Fall, spring. 1.5 credits. Prerequisites: NBA 506 or permission of the instructor, and mastery of basic EXCEL skills. Staff.
Financial modeling is the art and science of constructing spreadsheet models of firms' future financial statements. This class, builds on the brief introduction to financial modeling in NBA 506 by modeling the effect on the income statement, balance sheet, and statement of cash flows of more complicated financial transactions such as leveraged buyouts, mergers & acquisitions, and corporate reorganizations. The class meets in the state-of-the-art Parker Center computer lab, and active student participation is emphasized.

NBA 512 Applied Portfolio Management
Fall, spring. 3 credits. Restricted. C. Lee.
An accounting/finance elective course that focuses on the management of an investment fund (see Charles Lee for a full course description). Students enrolled in this course must commit to taking the course for fall and spring semesters. They will receive three credit hours for each semester's work. Strong preference is given to second year MBA students who have successfully completed either NBA 506 or one of the finance immersions. Students need to apply formally. If the number of applicants exceeds 12, admission will be competitive and merit-based.

Economics

NBA 523 Business and Economic Forecasting
Spring. 1.5 credits. Prerequisite: NCC 501 or the equivalent. R. Highfield.
This course focuses on statistical and econometric approaches to forecasting business and economic data series that have a time dimension (time series). The course provides students with a toolbox of time series forecasting methods and teaches them how to choose the appropriate one. Topics include the relationship of forecasting to decision making, univariate methods such as ARIMA modeling, and some multivariate methods such as transfer function, regression, vector autoregression, and neural networks. Applications will usually involve the forecasting of business and economic data. Although statistical theory will be covered as necessary with lecture and supplemental class notes, the emphasis will be on applications and learning by doing. Passing the course requires participation in class discussions and satisfactory performance on both individual and group projects. There are no exams. There is no text for the course but students will be required to use the student version of a sophisticated econometric software package.

NBA 524 Macroeconomics and International Trade
Fall. 3 credits. Prerequisite: NCC 502 or equivalent or permission of the instructor. R. Lind.
The course applies basic macroeconomic theory to such problems as inflation, unemployment, economic growth, and productivity and examines how those problems interact with international trade and finance. Students learn to be informed observers of national and international economic policies and discerning users of economic analyses and forecasts. A lecture/discussion format is used as the method of instruction.

NBA 527 Applied Economic Analysis (also ECON 616)
Spring. 4 credits. R. Frank.
This course will emphasize how economics analysis can help firms and individuals make the most of their opportunities. Of special interest to managers and consultants will be the course's focus on examples that illustrate how faulty economic reasoning leads to inefficient outcomes. The course will also emphasize strategic thinking, and will instruct students in the art of "economic naturalism"—the use of economic reasoning to understand and explain patterns of individual and firm behavior.

Finance

NBA 540 Advanced Corporate Finance (Theory and Practice)
Fall, spring. 3 credits. Prerequisite: NCC 506 or the equivalent. Students who took NBA 540 and/or NBA 548, 1.5 credit version, can not enroll in this course. H. Bierman.
This course is relevant for both investment banking and the treasurer's activities of an operating corporation. Most class sessions are lecture-discussion, but there are several corporate finance cases. The topics include

common stock, preferred stock, debt securities (duration, convexity, inverse floaters, bond refunding, term structure, swaps), hybrids, security design, weighted average cost of capital, basic capital structure issues, cash distribution policy, and the buy versus lease decision. The use of debt to add value, mergers and acquisitions, corporate restructuring, LBO's and MBO's, and Merchant Banking are also covered.

NBA 541 Economic Evaluation of Capital Investment Projects

Spring. 3 credits. Prerequisite: NCC 506 or permission of the instructor.
B. Swaminathan.

This course deals with the evaluation of capital investment projects under uncertainty. The first part of the course focuses on traditional capital budgeting techniques using the discounted cash flow approach. This involves the estimation of cash flows, the treatment of risk and discount rates, the role of inflation and taxes, and the use of single factor and multi-factor asset pricing models in determining discount rates. The second part of the course focuses on the valuation of future investment opportunities of a firm using option pricing techniques. This includes issues such as flexibility options, options on real assets, evaluation of natural resource investments, and evaluation of new product investments. The methods of instruction are lectures, case discussion, spreadsheet exercises, statistical exercises, and seminars by practitioners. Students are evaluated on the basis of mid-term and final examinations, cases, and homework assignments.

NBA 542 Investments and Portfolio Analysis

Fall, spring. 3 credits. Prerequisites: NCC 501, 502, and 506, comfort with quantitative methods. H. Li.

This course deals with several important issues pertaining to investments in securities markets. First it deals with portfolio diversification theory, asset allocation, asset pricing models (e.g. CAPM and APT) and empirical anomalies such as size effect, January effect, and others. Second, the course also deals with the issue of evaluating portfolio performance and mutual fund performance. Third, it deals with investment strategies based on patterns in historical security returns. This may be loosely considered technical analysis. In addition, the course deals with investment strategies based on publicly available information related to accounting and other market statistics and the use of earnings forecasts. This may be considered as falling under fundamental analysis. Finally, the course deals with frictions to trading imposed by the institutional structure of securities markets. The goal of this course is to train students in the latest tools and techniques in portfolio theory and familiarizes them with the latest developments in securities market research and applications. This is a highly quantitative course involving extensive analysis of security market data using regression analysis and other statistical tools. Grades are based on mid-term and final exams, cases, a project, and a trading game.

NBA 543 Financial Markets and Institutions

Fall, spring. 3 credits. Prerequisite: NCC 506 (Finance core). M. O'Hara, W. Bailey.

This course applies principles of finance in order to understand modern financial markets. Central themes are the structure of financial markets, their pricing function, the interaction between financial markets and macroeconomic conditions, and the processes of innovation and regulation in these markets. Students look at the workings of a variety of markets and develop an understanding of the different problems which different types of markets address. The question of market efficiency and the interaction between government policies and financial markets is studied. We analyze issues in innovation and regulation with basic principles of financial economics. Throughout the course, the relevance of these issues for the practical corporate, portfolio, or public sector decision maker is considered. The course includes ideas and evidence from academic research along with historical, institutional, and international perspectives. Recent events are used to illustrate concepts and develop analytic skills. Spreadsheet assignments and a term project requiring data analysis develop research skills and illustrate academic concepts. Exams consist of computational, short answer, and short essay questions.

NBA 545 Corporate Finance

Fall, spring. 1.5 credits. Prerequisite: NCC 506. Staff.

This half-semester course covers some of the more advanced topics in the area of corporate finance, including executive compensation, corporate governance, and bankruptcy law. The course includes lecture/discussion sessions in which the main ideas and the existing evidence (i.e., the theory and the empirics) will be presented and discussed. Cases will be used to illustrate the importance and applicability of these ideas and to provide a "hands on" understanding of the material.

NBA 546 Introduction to Derivative Securities

Fall, spring. 3 credits. Prerequisite: NCC 506 (Finance Core) or permission of the instructor. C. Gukhal, H. Li.

The course introduces students to the pricing and hedging of derivative securities. The course briefly covers forward contracts, futures contracts, and swaps. The primary emphasis is on option contracts. Underlying assets include stocks, currencies, and commodities. Fixed income derivatives are covered in NBA 555. The method of instruction is primarily lectures, supplemented by guest speakers. A midterm and a final exam comprise roughly half the grade, with the remaining half determined by assignments and class participation. The course is a prerequisite for NBA 550, Advanced Topics in Derivative Securities.

NBA 547 Applied Financial Engineering (also OR&IE 565)

Spring. 4 credits. Prerequisites: NCC 506, NBA 546, NBA 555, NBA 542, OR&IE 523, OR&IE 523, COMS 211, permission of instructor. Staff.

This course is designed to integrate students' course work in engineering (computing, stochastic modeling) and finance (options/futures and investment theory) through the completion of a project. The course project will be undertaken via student groups. It will involve the implementation of a financial model to a real world problem. The implementation will include model formulation, computer programming, data collection, and data analysis. The course format will be a mixture of lectures by faculty, industry professionals, and students (project presentations).

NBA 550 Risk Management with Derivatives

Spring. 3 credits. Prerequisites: NBA 546 and NBA 555 (NBA 555 can be taken concurrently). R. Gukhal.

This course studies advanced topics in derivatives and risk management. The first part of the course covers topics in derivatives and develops the tools necessary for analysis and the second part covers their application to risk management. This course is intensive and demanding—about 50 percent more demanding than the Fall NBA 546 course.

NBA 551 Current Topics at the Crossroads of Law and Finance

Spring. 3 credits. M. O'Hara.

This course explores a series of selected topics that involve important issues in law and finance. The premise of the course is that financial institutions of all kinds, whether they are known as insurance companies, banks, investments banks, or pension funds, invest money and advise clients in a wide variety of settings. This agency relationship introduces a number of important dimensions to the intermediary-client relationship. This course will look at these issues from both an economic and legal perspective. Emphasis will be placed on the intersections between modern finance theory and legal analysis.

NBA 552 Cases in Corporate Finance

Spring. 3 credits. Prerequisites: NCC 506 or the equivalent. Recommended: NBA 540. Course is limited to second-year MBA's and Twelve-Month Option (TMO) students. Students who took NBA 535 and/or NBA 536, 1.5 credit version, cannot enroll in this course. H. Bierman.

This course consists of discussions of corporate finance cases dealing with corporate financing. Students will form groups and formally present one case and critique a second. This is in addition to the normal class sessions. The cases in this course deal with mergers, acquisitions, valuation, corporate restructuring, LBO's, MBO's, Merchant Banking, and the financing of corporations. The material applies equally to careers in investment banking and managerial finance. The course does not deal with sales trading or the details of managing an investment banking firm. Several executives working in corporate finance will present cases.

NBA 554 International Finance

Spring. 3 credits. Prerequisite: NCC 506 (Finance core) or permission of instructor. W. Bailey.

This course applies principles of finance to the international setting. International finance is different in two basic respects. First, the existence of multiple currencies adds risk to investment and financing decisions. Second, when corporations and portfolio investors cross international borders, both problems and opportunities arise. We focus on these issues and highlight how finance theory can be extended to address them. Starting with the basic principles of international finance students apply those principles to a variety of problems. The course helps students understand the ideas and research results of international finance and adapt what they learn to the practical problems in the increasingly globalized business world beyond the classroom. The first part of the class outlines three basic themes: exchange rate

volatility, barriers to international capital flows, and the value of international diversification. The second part of the class presents a variety of problems, examples, and applications from the three basic themes. These range from corporate finance applications of capital budgeting to portfolio management strategies. Spreadsheet assignments and a term project requiring data analysis develop research skills and illustrate academic concepts. Exams consist of computational, short answer, and short essay questions.

NBA 555 Fixed Income Securities and Interest Rate Derivatives

Fall, spring. 3 credits. Prerequisites: NCC 506 (Finance core), NCC 501 (Quantitative Methods core). R. Jarrow.

This course is designed to study the pricing, hedging, and risk management of fixed income securities and interest rate derivatives. Topics to be studied include: the term structure of interest rates, interest rate swaps (caps, floors, collars), the risk structure of interest rates, credit risk spreads, and corporate bond valuation. The method of instruction is lectures and discussion, with computer illustrations being an integral part of the class content.

NBA 557 Case Studies in Venture Investment and Management

Fall. 2 credits. Prerequisites: NCC 500 and NCC 506 or concurrent enrollment. W. Thomas.

A series of cases that focus on the venture capital investment process and on the subsequent management of such ventures. The primary perspective is that of the venture capitalist in assembling and evaluating information, preparing forecasts, assessing risks, developing and negotiating investment structure and terms, and deciding whether to invest. Cases also focus on management and financial problems, policy issues, and the relationship between venture capitalists and entrepreneurs. The secondary perspective is that of the entrepreneur and the techniques and skills employed in managing growing enterprises. Presentations by venture capitalists and entrepreneurs will supplement student discussion and analysis of cases. Grades will be based on written reports, quality of classroom participation, and a final exam.

NBA 558 Corporate Financial Policy

Spring. 1.5 credits. Prerequisite: NCC 506 (Finance core). Y. Grinstein.

The course will deal with frontier topics in corporate finance and investment strategy. The financial world is changing at an increasing pace. New financial products are coming to the markets, and the financial structure of many corporations is becoming more and more complicated. Corporate financial officers and investors (such as money managers) need to know the driving forces behind the financial products (debt, equity, and more complicated products) to understand the products themselves. Understanding these issues enable us to estimate firm values more precisely. The course objective is to enable students to better analyze financial situations they may encounter in the future, as well as firms' valuation techniques.

Entrepreneurship

NBA 530 Entrepreneurship Lab

Fall, spring. 3 credits. Prerequisites: NBA 564 Entrepreneurship, or concurrent enrollment, or permission of the instructor. MBA students only. P. Sears.

Students team up with entrepreneurs in the greater Ithaca area on defined projects, which will be integral to the companies' operations, such as production planning, new product launches, or assessing organizational structure. The goal of the course is for students to gain first-hand exposure to the application of functional knowledge in a start-up setting, while bringing real value to the host company.

NBA 531 Startup Forum: Cornell Technologies with New Venture Potential

Fall, spring. 1 credit. R. Holsten.

The course will focus on research at Cornell, which may be a basis for new business ventures. It will address the fundamental ways in which university-based research differs from industrial research. Students will explore and critique the business potential of each concept.

NBA 532 Venture Partnerships—The Corporate Business Development Role, Big Company vs. Emerging Company

Spring. 1.5 credits. P. Sears.

In an era when large corporations are 'downsizing' and 'outsourcing' in order to save on fixed costs, and emerging companies are dependent upon strategic partnerships with large companies as part of their financing strategies. The business development executive can be found at the vortex of this activity. Priorities for the business development executive are distinctly different depending upon the size and history of the enterprise. This course, taught by a venture capitalist who has also served as a Corporate Development Vice President for a Fortune 100 Company, examines the multitude of roles played by managers in business development jobs. A significant amount of attention is paid to planning and managing the merger and acquisition process, as well as key elements in negotiation of the strategic partnership. There will be several guest speakers, each an acknowledged expert in the field. Students will be assigned deal-making tasks in the context of a case study that will be the centerpiece of the course. Class dates to be announced. Students are expected to have read the Big Pharm case study prior to the first class.

NBA 559 The Venture Capital Industry and Private Equity Market

Spring. 0.5 credit. D. BenDaniel.

This course focuses on the industry from the practitioners' perspective. Topics include (1) an introduction to the private equity market focusing on the transactions that define the industry, its structure, participants, history and trends; (2) institutional private equity investing—now an increasingly important and dynamic part of the asset allocation mix; and (3) issues in private equity investing such as concentration in fewer, larger funds and the critical role of a new class of gatekeeper/consultants for limited partners. The course will involve four lectures and a final paper.

NBA 563 Initial Public Offerings and Acquisitions

Spring. 3 credits. J. Shulman.

An in-depth look at initial public offerings (IPOs) and acquisitions from a practitioner's point of view. With respect to IPOs the course will cover: the applicable statutory framework, pre-offering corporate preparation (such as implementation of poison pills and stock option plans), the due diligence process, the implementation of corporate governance policies appropriate for a public company, the offering registration process, liability under federal securities laws, the Securities and Exchange Commission review process, underwriting arrangements, pricing, selection of a trading forum (i.e., NYSE, NASDAQ, or AMEX) and the consequences of going public. Regarding acquisitions, the course will explore: financing alternatives, accounting treatment, due diligence, choosing an appropriate transaction structure (i.e., stock versus asset sale) and crucial aspects of acquisitions, such as letters of intent, continuity of employees, anti-takeover strategies, and non-competition agreements. Mr. Shulman is an attorney with experience in IPOs and acquisitions, and an adjunct professor at the Cornell Law School where he teaches a seminar course on this topic.

NBA 564 Entrepreneurship and Enterprise

Fall, spring. 3 credits. D. BenDaniel.

The course uses Cornell-developed case studies and lectures to address entrepreneurial management in start-up ventures and new-business development in existing companies. Among the topics covered are valuation of business, planning, obtaining resources, management of growth, and cashing out. Guest lecturers speak on specialized topics such as corporate and patent law, bankruptcy and work-outs, leveraged buy-outs, and valuations of businesses. Students team up to write and present business plans. The course attempts to integrate marketing, finance, operations, and human-resource topics in the context of high-growth business ventures.

General Management

NBA 560 Business Law I (also ARME 320)

Fall. 3 credits. Limited to juniors, seniors, and graduate students. D. Grossman.

The course introduces the basic tenets of law as they apply to businesses and their operations. Topics include personal property, contracts, agency, real property, and landlord-tenant concerns. Text readings and case studies are used. All students intending to be professional accountants are required to take the course, and it is strongly recommended for finance students.

NBA 561 Business Law II (also ARME 321)

Spring. 3 credits. Prerequisite: NBA 560 or permission of the instructor. D. Grossman.

The first portion of this course examines legal issues in the formation and operation of business enterprises, particularly partnerships, corporations, and limited liability companies. The second portion of the course will review selected topics in business law, such as employment discrimination, secured transactions, product liability, unfair competition, and international business law.

NBA 562 Estate Planning (also ARME 422)
Fall. 1 credit. Limited to juniors, seniors, and graduate students. D. Grossman.
Fourteen sessions on the various aspects of estate planning. The law and use of trusts, the law of wills, federal and New York State estate and gift taxes, and probate procedures are covered.

NBA 567 Management Writing
Fall, spring. 1.5 credits. B. Mink, A. Pike, M. Hittleman, C. Rosen.
Students learn to write clearly and effectively by focusing on the writing process as well as the finished product. Course topics include audience perspective, style, organization, strategy, and persuasion. There is a writing assignment every week. Students receive instructor and peer feedback. Priority given to MBA students. Open to other graduate students and employee degree candidates if there is room.

NBA 568 Oral Communication
Fall, spring. 1.5 credits. B. Mink, A. Pike, C. Rosen.
This course focuses on improving the presentation skills of management students. The course covers the areas of speaking formats (impromptu, extemporaneous, manuscript), delivery, organization, visual aids, and question/answer. Student speeches constitute the bulk of class time, with each student presenting seven or eight speeches in the seven-week session. The small class size allows for significant individual attention. Students receive feedback from classmates and the instructor, and have the opportunity to review in tutorials the videotapes of most of their presentations. Priority given to MBA students. Open to other graduate students and employee degree candidates if there is room.

NBA 569 Management Consulting
Fall, spring. 3 credits. A. McAdams.
The course is case-study oriented and focuses on strategic consulting. It has multiple objectives. First, it provides students with the opportunity to understand the role of the consultant and to gain indirect experience in that role through dealing with a broad range of practical and real-world issues. Second, it helps students improve their analytic skills through practice with case studies. Third, it provides students with information that they are unlikely to gain in other courses, as well as experience in making group presentations and evaluating them. Students are required to write a comprehensive analytic term paper.

NBA 570 Leadership in Management
Spring. 1.5 credits. MBA students only. R. Peterson, RPW Executive Development, and other Johnson School faculty.
This course is a partnership with RPW Executive Development to provide MBA students with the self-awareness and interpersonal skills required to be effective leaders (the general principles of leadership course is NBA 668). RPW has partnered extensively with the Johnson School Executive Education Department in the past. The course consists of five full-day training sessions. Staff from RPW and Johnson School faculty provide training. The first two days focus on self-awareness and employ several experiential exercises and self-assessment instruments including, the Campbell Leadership Index (CLI), Meyers-Briggs Type Indicator (MBTI), the Fundamental Interpersonal Relations Orientation-Behavior (FIRO-B), the Kirton Adaptation/Innovation inventory (KAI), and the Ambiguity Preference Scale (APS). Class members are also trained in giving and receiving feedback from team members and faculty. Mid-week activities include various leadership and team challenges, including a business simulation. Attendance is required each day of the course to receive credit. NOTE: most of the self-assessment instruments listed above will need to be completed prior to the first day of class to allow for scoring and analysis.

NBA 571 Cornell Management Simulation
Fall, spring. 1.5 credits. Restricted to second-year MBA students. J. Hass, S. Smidt.
This computer-based simulation is played by self-selected teams of four students who make marketing, production, and finance decisions for one of five companies operating competitively in the same industry. After the first week, during which the rules of the simulation are explained and the software used by each team is demonstrated, the teams make periodic decisions (meeting at their own convenience). At the beginning of the simulation, each team writes a Strategic Intent paper and, before the results of the last decision have been determined, each team presents an in-depth analysis of its performance and its strategy for the future in a "board of directors" meeting. Letter grading only, based on the value created for the company's shareholders (relative to other firms in the same industry), the team's Strategic Intent paper and the instructor's evaluation of team's performance at the BOD meeting. Students who have completed NBA 549 cannot take this course. Open to MBA IIs only. Meetings will be periodic throughout the semester.

NBA 573 Seminar in Sustainable Development (also ABEN 673)
Spring, first half of semester. S-U grading only. 1–3 variable credits. A. McAdams.
This seminar-style course will involve readings and discussion of issues in environmental management, and will also feature four significant outside speakers on the subject of environmental management. (Students interested in doing consulting projects in environmental management will be accommodated in NBA 575, Advanced Consulting.)

NBA 575 Field Projects
Fall. 3 variable credits. J. Russo.
The course teaches how to frame unstructured business problems through a hands-on team project. Teams must identify what the central issues are, and then determine the most appropriate tools and concepts to provide insight into these issues. Students also learn to approach business problems from a cross-functional perspective. Specific conceptual content includes: project management; power, politics, and personalities in work groups; managing in for-profit versus not-for-profit organizations; and organizational change. This course is not classroom-based. Although there will be a few class sessions early in the semester, the course structure will revolve around periodic reviews and coaching sessions as needed. The instructor team will contain one regular member of the Johnson School's faculty, an experienced executive, and an administator.

NBA 577 The Political, Legal, and Regulatory Environment of Business
Spring. 3 credits. R. Schuler.
The political climate, laws, regulations, and government arrangements for infrastructure have a profound effect on the nature, operation, and profitability of business. Many of the most important decisions that top management makes are driven by political, legal, and regulatory considerations (e.g., the responses of: Exxon to the Exxon Valdez oil spill; Union Carbide to the Bhopal, India, gas leak; and the decision of AT&T to accept the division of its company in response to an antitrust suit filed by the U.S. government). Environmental and waste-management concerns are leading to new laws and regulations that affect many aspects of business, creating opportunities as well as posing problems. The course begins with a discussion of the political and economic foundations of business regulation. Students examine different areas of application, including economic regulation, environmental regulation, antitrust, and product liability. Guest speakers include leading scholars from throughout the university and business and government leaders.

NBA 578 Business Ethics
Fall. 3 credits. Staff.
Students examine actual situations in business, both in the United States and abroad, that involve ethical issues affecting individuals and organizations. Students are challenged to decide on appropriate ethical positions.

NBA 579 Business Strategy
Fall. 1.5 credits. Enrollment limited to second-year MBA students only. J. Suwinski.
A well-defined strategy is essential for business success—describing where the business is going, how it's going to get there, and then providing a framework for making decisions along the way. Strategy is the responsibility of top executives of a company/business, and the ability to formulate effective strategy is one of the key skills that distinguishes General Managers from functional managers. This course will focus on the process of effective strategy formulation from the perspective of the general manager of a business unit. This perspective also applies to consultants working for clients on business unit strategy. Corporate strategy and its interaction with business unit strategies will be discussed, as will tools for industry and company analysis. Situational analysis will also be covered. This course compliments the core strategy course, with emphasis on understanding and practicing frameworks that are useful in case-based interviews. The course draws heavily on the instructor's experience developing strategy for numerous businesses at Corning Incorporated. Guest speakers from industry and strategy consulting firms and also from industry present their approaches to strategy, and discuss the analytical tools they find most effective in working on business strategy. Students gain experience, via assigned cases, in analyzing business problems/opportunities, using the strategic process to formulate effective business strategies, and in presenting their recommendations in written and oral form. A major case write-up and presentation in a mock board environment at the end of the course gives each student an opportunity to play the role of a strategy consultant working on a real case.

NBA 653 Strategic Alliances: Lessons from Experience

Spring. 1 credit. J. Suwinski.

A wide variety of strategic alliances are being used today as companies try to leverage their resources for competitive advantage. This course gives an overview of the spectrum of alliances, examining the strategic rationale and pros and cons of each major type of alliance. The primary focus of the course is on joint ventures as a specific form of strategic alliance, where the success rate is less than 50 percent. The course develops a set of principles that have contributed to success for Corning Incorporated. The course is taught from the perspective of the general manager of a major business unit.

NBA 665 Managing Technology and Innovation

Spring. 3 credits. Staff.

This course is designed for students who see themselves in settings where they have to develop new products or processes and for students who must implement change in existing products or processes. Major issues involved in managing the introduction of new technology, including competitiveness, technology assessment, R&D strategy, and positioning. We examine how industries are transformed by new technologies and how innovations diffuse among firms. Also considered are internal management issues, including such topics as the structure of innovative organizations, the design of incentive and reward systems that foster risk taking, the way innovation champions manage new-product development through cross-functional teams, and the role of executive leadership. The course uses a combination of readings, lectures, discussions, case analyses, and guest lectures.

International Management

NBA 576 The World Geopolitical Environment of Business

Fall. 3 credits. R. Lind.

The geopolitical face of the world is changing at a pace that few could have envisioned even five years ago. The unification of Germany, the fall of communism, the institution of sweeping economic restructuring in the former Soviet Union, the move toward democracy with market economies in eastern Europe, the movement of Europe toward a unified economy, and the flirtations with reform and its implications in China are just a few of the many examples of the changing world environment of business. This course provides students with a view of those fast-paced worldwide changes. Topics covered include developments in western and eastern Europe, the former Soviet Union, the Pacific Rim, Central and South America and the Middle East and the role and fate of developing countries in the world economy. Guest speakers include leading scholars from Cornell and other universities and leaders in business and government.

NBA 580 Strategies for Global Competitiveness

Spring. 3 credits. A. McAdams.

Initially, students explore the role of government in several private-market industrialized nations—Japan, France, Germany, the United Kingdom, and Italy—for lessons the United States might learn and use. Students investigate the impact in each of those countries of government policies on the global competitiveness of the country's firms. Special emphasis is given to differential policies appropriate to each of a range of industries, from the mature to the high tech (including computers, telecommunications, and electronics), and to stages of development in each economy. Possible lessons are then tested for less developed countries that might include Venezuela and Malaysia and newly emergent countries such as Singapore. Classes are run in a discussion format. This course can be used to fulfill the strategy requirement.

NBA 581 Special Topics—Contemporary Development of Southeast Asian Economies

Spring. 3 credits. I. Azis.

This course analyzes the patterns and processes of Southeast Asian economic development during the last three decades. The five plus two countries in the region that will be the focus of the course include Thailand, Indonesia, Malaysia, Singapore, the Philippines, Brunei, and Vietnam. The topics will be divided into the following categories: Southeast Asian economic development, regional economic cooperation in Southeast Asia, and the financial crisis of the 1990's. The course assesses important factors and consequences of the region's development patterns and uses international comparative analysis to explicate the relative position and uniqueness of the region's performance. Evaluation will be based equally on the student's participation in class discussions and debates and on a term paper.

NBA 584 International Competitive Strategy

Fall and spring. 1.5 credits. This course can be used to fulfill the strategy requirement. J. Katz.

The course focuses on the development of competitive strategies in the global environment—including the identification of internationally relevant strengths and weaknesses, the movement and use of resources to gain competitive advantage, and strategies to confront competitors, both domestic and multinational.

NBA 585 Cross-National Management

Fall. 1.5 credits. J. Katz.

Focuses on the differences in managerial style across countries and develops skills to deal with these differences. Most of the material will be applicable to all countries, though two specific countries will be highlighted each semester.

NBA 586 Global Management Structures

Spring. 1.5 credits. Prerequisites: the new version of NBA 584. J. Katz.

Focuses on the control, communication, and coordination systems within multinational corporations. Design and development of appropriate systems, to ensure enactment of corporate strategy will be addressed.

NBA 587 International Mergers & Acquisitions

Spring. 1.5 credits. J. Hanks.

This course covers issues relating to mergers and acquisitions in an international context. Topics include business due diligence, pricing and negotiation, and other important topics from both the buy and sell side. The course uses both lecture and case formats. Students are evaluated on the basis of group and individual written assignments.

NBA 590 Managing in Developing Countries

Fall. 1.5 credits. J. Katz.

This class centers on the unique features of industrialized and newly industrializing countries as hosts for multinational business operations. It is a case-based course; each class is spent discussing one or two cases. Topics include environmental variation and how to deal with it and concentrated national power structures and their management. A large number of countries spread throughout the world are covered. Students are responsible for providing in-class updates on the countries discussed. Grading is based on the country update presentation, a final case write-up, and class participation.

NBA 592 Experience in International Management

Spring. 1.5 credits. J. Katz.

The objective of this course is to combine classroom sessions and international experience with an increased awareness of business environments outside the United States. NOTE: participation in a faculty approved study trip is required to complete this course (fee charged). On trips, students will visit local businesses, subsidiaries of foreign multinationals, government officials, local business school students, and others. Students must also attend two pre-trip meetings (1 1/4 hours each) and two Saturday meetings during spring semester (2 1/2 hours each). Those meetings will be used to present information on international business conditions, industrial structures, management styles, and also, to develop cross-cultural skills. A final paper, integrating the material learned in the classroom with their experiences, will be required.

Management Information Systems

NBA 601 Electronic Commerce

Spring. 3 credits. Letter/S-U optional grading. L. Orman.

Electronic commerce is the use of information technology in conducting economic transactions and managing businesses over computer networks. It is a phenomenon that has captured the public attention because of its wide-ranging implications for businesses, markets, public institutions, and the general public. Electronic commerce involves a wide variety of cooperating technologies such as communications, networks, databases, expert systems, and multimedia. It also affects a wide variety of managerial issues. Electronic commerce created a new emphasis on information technologies and systems in management. It led to the development of new technologies and new combinations of existing technologies to support management. On occasion, it radically altered business practices and the role of management.

The students in this course learn to conduct economic transactions and manage businesses on the Internet. All major technical and managerial issues are covered through computer exercises on the Internet, and case studies and examples of businesses on the Internet.

NBA 612 Imaging and the Electronic Age

Fall. 3 credits. D. Greenberg.

The advances of computer graphics, computer processing power, network bandwidths, and video compression technologies are forcing the merger of the telephone, television, and computer industries. The influence of these

technologies has created paradigm shifts that will drastically change the way we communicate, how we are educated, the way we work, design, and in essence, how we will live in the next century. We are just beginning to fathom how these changes will influence our modus operandi and greatly modify our traditional patterns of behavior, both personal and organizational. Clearly, business and industry management will have to understand the implications of the advanced technology. This course will start by presenting historical technological advances that created major paradigm shifts for communications. Advances in computer technology emphasizing the fundamentals behind the increases in processing power, video and computer graphics capabilities, and network transmission will be presented. The latter half of the course will cover the effect of these scientific advances on many discipline-specific areas including photography, the film industry, the entertainment and animation industry, television broadcasting, publishing, as well as the computer industry itself. Sessions will be devoted to the social and legal issues rising from the rapid advances in electronic communication. In attempting to predict the disruptive changes of the future, it is best to understand the technologies themselves. Thus, students with technology or science backgrounds are preferred. Although no computer programming will be required, a working knowledge of computers is necessary. The course will be especially tailored to a business school and industrial concerns and will have interactive live demonstrations at the state-of-the-art laboratory of the Program of Computer Graphics. No prior knowledge in computer science is required.

NBA 614 Managing in the Information Age

Fall. 1.5 credits. A. McAdams.

In this course we explore a topic that is just beginning to emerge: the implications of the explosion of the Internet and interactive multimedia communications for the way managers think and manage. We examine the origins of the Internet and some of the forces that have let to its rapid development, noting along the way, why and how it has "blindsided us" as Andy Grove of Intel and Bill Gates of Microsoft candidly stated. We then look at how information is being used today in pioneering applications in organizations of various kinds based, in part, on original case studies and on guest lecturers. Throughout the semester the student is asked to identify new and innovative use of modern information technologies. The course itself will evolve, even in real time, with the development in the field.

NBA 615 Information Technology to Manage Business

Fall. 1.5 credits (variable). A. McAdams.

This course relies on visiting speakers from several technology-based firms. The speakers address how to manage the information technology function as a business and how to use IT to deal with business problems. Speakers come from hardware companies, software companies, and other organizations dealing with large issues of managing the information resource. There are assignments, with student groups interacting with speakers, and a short paper at the end of the course. The course meets approximately 10 times during the semester for up to two hours.

Marketing

NBA 520 Pricing and Strategy

Spring. 3 credits. Prerequisite: NCC 502. V. Rao.

This course extends material introduced in the core microeconomics course, where the focus is on pricing decisions. The course is taught very much like the core microeconomics course; it consists mostly of lectures and problem sets that use the ideas contained in the lectures. Some understanding of calculus is required. The grading for the course is based on a midterm exam, a final exam, and a paper. Specific topics covered include price discrimination, peak-load pricing, product line pricing, and pricing when information is asymmetric.

NBA 620 Marketing Research

Fall. 3 credits. Prerequisites: NCC 501 and NCC 503, or the equivalent. V. Rao.

This course deals with marketing research as a critical support function in corporations. The broad objective is to provide a fundamental understanding of marketing research methods employed by better managed firms or proposed by leading academicians. The course is aimed at the manager, the ultimate user of marketing information, who is responsible for the scope and direction of research activities involved in obtaining, analyzing, and interpreting results of research. The course covers the use of secondary sources of marketing information for designing studies and collecting primary data. Students are exposed to up-to-date methods in research design, qualitative research, measurement, data collection, and analysis. The emphasis is on evaluating research methods and on interpretation and use of results rather than on mathematical derivations. Students are also exposed to the practical side of marketing research through case studies, problem sets, and projects.

NBA 621 Marketing Communications

Fall. 1.5 credits. Prerequisite: NCC 503 (Marketing core). D. Stayman.

The course is designed to give students an understanding of the advertising and promotion management process. It covers the components of a successful advertising campaign and helps students develop an appreciation of the issues involved in advertising planning and decision making. They also learn how recent social-science findings and theory can facilitate advertising management.

NBA 622 Marketing Strategy

Fall. 3 credits. Prerequisite: NCC 503 (Marketing core). V. Rao.

The course balances theoretical and practical approaches to the development and evaluation of marketing strategies for multiproduct firms. It considers various environmental opportunities and constraints in developing and evaluating integrated marketing strategies for new and established products and services. Recent research results are applied to decisions on product-market boundary definition, resource allocation, product positioning, and competitive reactions. It includes selected current topics such as brand equity, acquisitions, and lead-user analyses. Students use case studies extensively to develop skills in strategy analysis and to enhance skills in assessing external threats and opportunities. They employ computer-assisted market strategy simulations to evaluate the effects of competing strategies. Guest speakers from industry provide a view of the operational aspects of marketing strategy.

NBA 623 Customer-Based New Product Development

Fall, spring. 1.5 credits. Prerequisites: NCC 501 and NCC 503.

The successful introduction of new products requires careful planning and systematic screening and testing. This course covers models and methods that are useful to managers in the development and marketing of new products. Heavy emphasis is placed on the measurement of consumer preferences. Students are required to complete a group project, consisting of a measurement instrument, data collection (from at least 30 respondents) and data analysis, for a self-chosen product category. The method of instruction consists of a combination of lectures and discussion of cases and articles. Performance is evaluated primarily based on exams and the group project.

NBA 625 International Marketing

Spring. 1.5 credits. Recommended: NCC 503. J. Katz.

Designed to train students to take a domestic product and expand it into international markets successfully. Market selection, international market research issues, and international marketing strategies are all discussed. The term project (actually submitted in three parts throughout the term) requires that students choose some product and develop a plan for taking it abroad. Each class includes cases, therefore, class preparation is essential. Grading is based on the term project, the final, and class participation. Core marketing provides a useful background, but is not a prerequisite.

NBA 626 Consumer Behavior

Spring. 3 credits. Staff.

Topics include factors that influence response to advertising of various kinds, purchase decisions, product perceptions, response to promotion, consumer satisfaction, and the basic methodologies for understanding consumer behavior.

NBA 627 Affect, Brand Equity, and Internet Marketing

Spring. 3 credits. A. Isen.

The course will focus on concepts central to brand equity, including brand association, brand perceptions, brand loyalty, relationship marketing, and brand extensions and revitalization. Special focus is placed on the role of affect (feelings) in decision-making and thought processes that are fundamental to these and other concepts central to brand equity establishment, maintenance, and management. Additionally the course covers the emerging area of Internet marketing from the consumer perspective relative to brand equity, including consumer response to the Internet as a medium and marketing channel.

NBA 630 Policies for Marketing Channels

Spring. 3 credits. Prerequisite: NCC 503. V. Kadiyali.

Marketing channels are analyzed as a chain of interdependent and interlocking organizations that produce and deliver goods and services to various types of consumers. This course looks at various aspects of these relationships, such as efficiency, conflict, incentives, and government intervention. Instruction consists

of lectures, cases, and guest speakers. Evaluation is based on cases and a final project (presentation and write up) and on class participation.

NBA 631 MARKSTRAT Simulation
Fall. 1.5 credits. Prerequisite: NCC 503. V. Rao.
MARKSTRAT Simulation offers an opportunity for students to make various marketing strategy decisions in a realistic, dynamic, simulated, competitive environment. Students, working in teams, manage a portfolio of a firm's products for several years (periods). They learn how to make long term decisions (introduction of new products) and deal with various cross-functional issues related to marketing management (e.g., research and development, product design, and budgeting). A major portion of the course will be devoted to an understanding of the basic concepts (e.g., competitive positioning, resource allocation, market segmentation and product design) on which the game is based, and to a discussion of suitable methods of analysis of data generated in the game. Students develop an initial strategy statement and strategic marketing plan for their firm. This game has become quite popular in various competitive schools of management. Students develop an initial strategy statement and strategic marketing plan for their firm.

NBA 633 Internet Marketing
Spring. 1.5 credits. V. Rao, D. Stayman, V. Kadiyali.
This class explores the effect of the Internet on marketing. Topics include an overview of the on-line industry, business models for the Internet, advertising and promotions on the Internet, marketing research on the Internet, loyalty programs for Internet marketing, and disintermediation or channel conflict resulting from Internet distribution. The course is comprised of industry speakers from Cendant, CSC, Netcentives, H-P, 1st USA, Catalina marketing, Bausch and Lomb, and others. Course requirements include write-ups on a subset of speakers, and a final report and presentation on an Internet marketing issue of the student's choice. NBA 638 is restricted to MBA II's because the same information is available for MBA I's in the strategy core.

NBA 635 Marketing Models
Fall. 3 credits. Prerequisite: NCC 503. V. Kadiyali.
Students learn to use mathematical models to solve marketing problems. The objective is to develop students' skills in evaluating marketing models and implementing them in management practice.

NBA 637 Direct Marketing
1.5 credits. Prerequisite: NCC 503 Marketing Management, or equivalent. V. Rao, D. Stayman.
The objective of this short course is to expose MBA students to selected contemporary issues in the area of direct marketing. In addition to providing an overview of the direct marketing industry and trends in database technology, the course addresses major strategic and tactical issues in the management of direct marketing. Discussions cover the perspective of a marketer interested in employing the opportunities in direct marketing as an integral element of the marketing mix for a product/service. The course also addresses appropriate ethical concerns with direct marketing. To acquire a flavor of various practices in the industry, students visit one or two direct marketing firms in New York City or its vicinity toward the end of the course.

NBA 638 Analysis of Competitive Decision Making
Spring. 3 credits. Prerequisite: NCC 502 (Microeconomics core course). V. Kadiyali.
This course brings methods of microeconomics analysis to competitive decision making. Specifically, it addresses issues relating to optimal competitive decisions for a firm interacting with current and potential rivals. Discussions cover how firms can, by their choice of appropriate decisions, best signal to rivals their intentions and their degree of commitment. Also considered are sustainability, flexibility, and correction of decision choices. Game theoretic perspectives are used to understand these concepts. The dimensions of competitive strategy considered include product proliferation, R&D and patent policies, choice of compatibility with existing products, bundling of products, investing in capacity, vertical integration, choice of channels of distribution partners, pricing, and promotions. Also discussed are problems caused in the optimal choice and implementation of firm strategies when information is imperfect. Specifically, considered are issues of moral hazard and adverse selection, and how these issues affect firm choices of strategies (e.g., pricing, choice of channel partners, etc.). Instruction includes lectures and cases. Student evaluation is based on cases, class participation, and a final project. This course can be used to fulfill the strategy requirement.

NBA 639 Data-Driven Marketing
Fall. 3 credits. Staff.
Data-Driven Marketing introduces the future brand manager or marketing consultant to the use of market data to evaluate and construct pricing and promotional strategies. The course introduces new sources of data available on product purchases and consumers' reactions to the marketing environment. The course focuses on the practical use of popular data sources. Approximately 70 percent of the course covers panel data on high-volume consumer packaged goods, and 30 percent is devoted to direct or "database" marketing. The goal of this course is to introduce these new data sources and provide a solid foundation for the development of analytic tools. Examples are drawn from the consumer packaged goods industry. This course makes intensive use of EXCEL and the WINDOWS computing environment. The data has been extracted and organized for use in EXCEL; this allows the student to concentrate on learning modeling tools without a large investment in computing or data manipulation methods.

Operations Management

NBA 641 Logistics and Manufacturing Strategy
Spring. 3 credits. Prerequisite: NCC 508, OR&IE 410, or permission of the instructor. L. J. Thomas.
The course is about supply-chain integration, which involves strategic management of the values chain, from materials to customer. Students discuss operations strategy issues that are important to both manufacturing and service. The course emphasizes written and oral communication skills. About a fourth of the classes are spent on case studies, with small groups presenting their analyses of them. There is one mid-term examination, but the majority of the grade is evaluated based on projects and class participation. There is an option of replacing some assignments with a "live case," a project with a local company.

NBA 644 Quality Management
Fall. 3 credits. Prerequisite: NCC 508 or permission of the instructor. L. Robinson.
The theme of this course is the design and improvement of products and processes. The topics covered within this survey course include: (1) principles of process improvement (the formal seven-step improvement process, quality tools); (2) process monitoring (statistical process control, process capability, Motorola's "6 sigma" program); (3) product design (the Kano model, customer satisfaction and delight, issues in survey design, quality function deployment (QFD), design and manufacturability); (4) product delivery and support (quality in service and administration, satisfaction guarantees, and customer loyalty); (5) process design and improvement (kaizen vs. business process reengineering, benchmarking, design of experiments); and (6) issues in implementing quality improvements. The structure of the course emphasizes "hands-on" applications of the principles and learning's from the course. The guest speakers and local plant tour are supplemented with Harvard cases, several exercises (e.g., assuming the role of a Baldridge Examiner, finding and correcting the root causes of problems in a process), and homework assignments (to allow students to work through quantitative problems without any time pressure). A sizeable component of this course is a group project, which applies the formal quality improvement process at a local firm.

NBA 645 Product Development Practicum
Spring. 3 credits. J. Thomas.
This course centers on developing a major new product for firms. It involves training in creativity by a consulting firm and readings in product development. This course provides the opportunity to learn from many different sources, consultants, faculty, and executives.

NBA 646 Managing Knowledge-Based Services
Spring. 3 credits. Prerequisite: NCC 508. Staff.
This course is designed for students who plan to manage technical and high-skill service enterprises. The pros and cons of the "service economy" are discussed, and the unique aspects of producing service products, focusing on high-end, high value-added services are examined. Although some consumer service examples are included, the primary emphasis is on corporate and industrial services that occur between large firms, including technical, financial, and expert services. The use of traditional operations management tools in the context of service industries, as well as concepts from other disciplines such as sociology, psychology, and economics is explored. In addition to managing the efficient provision of services, service design, marketing, evaluation, and improvement are addressed. The course uses a combination of case analyses, discussion, student projects and presentations, guest lectures, and readings.

NBA 652 Integrating Product Design, Marketing, and Manufacturing
Spring. 1 credit. J. Bradley, J. Thomas.
The course makes apparent the necessity of integrating product design, marketing, and manufacturing for a firm's success. Managerial tools and useful concepts that facilitate this integration are introduced. Students have the opportunity, through homework assignments or projects, to make a more in-depth foray into the course topics.

Organizational Behavior

NBA 663 Managerial Decision Making
Fall. 3 credits. J. Russo.
This course presents practical concepts from the behavioral sciences that can serve as guides to managerial action. Lectures, cases, and exercises are used to acquaint students with new perspectives on decision making, critical thinking, problem solving, and group processes. Taken together, these perspectives offer a trouble-shooter's guide to the uncertainty, complexity, and conflict in the business world.

NBA 666 Judgment and Negotiations
Fall, spring. 3 credits. Staff.
Judgment is the art and science of transforming perception into thought or opinion. Negotiation is the art and science of securing agreements between two or more interdependent parties. The purpose of this course is to understand the theory and processes of negotiation as it is practiced in a variety of settings. This course is designed to complement the technical and diagnostic skills learned in other courses. A basic premise of the course is that while a manager needs analytical skills to develop optimal solutions to problems, a broad array of negotiation skills are needed for these solutions to be accepted and implemented. The course highlights the components of an effective negotiation and teaches students to analyze their own behavior in negotiations. The course is largely experiential, providing students with an opportunity to develop their skills by participating in negotiations and integrating their experiences with the principles presented in the assigned readings and course discussions.

NBA 667 Managing Intellectual Capital
Fall. 1.5 credits. B. Nelsen.
As the twentieth century draws to a close, economies long based on manufacturing are giving way to those based on the management of information, the production of knowledge, and the provision of services. Hence, organizational profits will increasingly flow from intellectual rather than material capital. A firm's success will hinge upon the manager's ability to recognize and adapt to the unique challenges presented by managing intellectual capital. This course examines this shift in the business environment and its practical implications for managers. Topics addressed include (1) motivating and managing knowledge workers; (2) employee empowerment and self-managing teams; (3) organizational learning; and (4) leadership for innovation and creativity.

NBA 668 Leading Teams and Organizations
Fall. 3 credits. R. Peterson.
This course focuses on general principles for successfully leading teams and organizations (the personal development course is NBA 570). The course draws on the latest research in team decision making and organizational leadership to address questions such as: what is the difference between leadership and management? how does a leader establish trust and commitment to an organization? and how do leaders transform organizations? The course consists primarily of case studies of leaders, but also includes some experiential and group activities. Course grading is based on class participation, group case analyses, and a final individual case analysis. Priority is given to MBAs.

NMI AND NRE RESEARCH AND ADVANCED STUDIES

NMI 500–502 Directed Reading and Research
Fall, spring. 1, 2, or 3 credits. Staff.
Students undertake special-interest research under the supervision of faculty members. Registration is limited to students who have the approval of their advisers and of the faculty members involved in the research.

NMI 510 Multi-Cultural Work Environments
Spring. 1 credit. C. Rosen, B. Mink.
NMI 510 is a independent study course that is open to students whose summer internships will be in a country other than that of their citizenship or prior work experience. The goal of the course is to promote an understanding of the cultural assumptions we bring to the work environment and the effects of cultural differences on organizational interactions and productivity. Registration for the course occurs in the spring semester prior to the internship, and grades are posted in the following fall semester after completion of the course project (a 10-page paper). Students may register for the course after obtaining an internship offer and completing the paperwork for the course instructors. International students obtain and process work authorization forms with the International Students Office. See Charlotte Rosen (Sage 304) for further details about the academic and immigration requirements for NMI 510.

DOCTORAL SEMINARS

NRE 502 Doctoral Seminar in Marketing
3 credits. Staff.
This class introduces students to empirical research in marketing. There is a strong focus on the historical development of econometric specifications of consumer choice models (with an emphasis on heterogeneity and issues of dynamic consumption patterns), and Bayesian methods in marketing. However, by the very nature of the class, the content is to some extent be driven by the participants in the course. Teaching is interactive, and each participant is expected to present one of the papers studied to the rest of the class. Furthermore, each participant is expected to replicate the results of one of the papers, requiring the participant to write the necessary code and briefly discuss their findings.

Enrollment is by consent of the instructor. Students are required to have taken a graduate level course in either mathematical statistics or econometrics, although this restriction may be waived in special cases. Students are welcome to sit in on parts of the class; for example, the section on Bayesian Methods will be broad enough that students from other areas may find the presentation useful.

NRE 504 Doctoral Seminar in Accounting
3 credits. This course is for Ph.D. students only. Staff.
The seminar provides a rigorous and integrative exposure to those aspects of the literature in accounting, behavioral economics, and psychology that are related to questions of accounting and auditing theory and research.

NRE 507 Doctoral Seminar: Affect and Cognition
Fall. 3 credits. Prerequisites: courses in statistics and experimental design. A. Isen.
The course examines research on some of the ways affect influences such thought processes as memory, decision making (including risk taking), and problem solving (including creative problem solving). Applied topics relevant to management concerns (for example, organizational behavior and consumer behavior) as well as other theoretical and applied topics (among them medical decision making, social interaction, self-concept, and cognitive and affective development) are considered, depending on student interests.

NRE 509 Doctoral Seminar in Research Methods
3 credits. Staff.
This course concerns the fundamentals of scientific research: theory, research design, methods, and criticism. It is designed for doctoral students who wish to undertake research publishable in scholarly journals. Little or no scientific training is assumed. Statistics will not be emphasized; however, familiarity with elementary statistical concepts and inference will prove useful. The course will cover: (1) the principles of theory building; (2) the pros and cons of various general research designs (laboratory and field experiments, surveys, interviews, participant observation, archival studies, simulations, and formal mathematical models); and (3) the structure of research papers and the review process.

NRE 511 Doctoral Seminar in Finance—Corporate Finance
1.5 credits. Staff.
This course covers topics in corporate finance and empirical asset pricing.

NRE 513 Doctoral Seminar in Finance—Market Microstructure
3 credits. Staff.
The course examines recent research in market microstructure, particularly as it relates to theoretical issues. Topics covered include asymmetric information in securities markets, market behavior, and market structure.

NRE 514 Doctoral Seminar in Finance—Asset Pricing Theory
1.5 credits. Permission of instructor required. Staff.
This course covers asset pricing theory as based on either economic equilibrium or the absence of arbitrage. The method of instruction is primarily presentations given by the students on important papers. The presentation and the final exam each comprise about half the grade.

NRE 515 Doctoral Seminar in Behavioral Decision Research

Spring. 3 credits. J. Russo.

This seminar focuses on decision making. The first topic is competing paradigms for research in decision making. A central question of this topic is, "Which paradigms have been most successful or show promise in being most productive in the future?" Other topics will be guided by the interest of participants. They include connectionist approaches, dynamical systems, the interpretation (and distortion) of information, consistency-based theories, biased allocation of attention, and memory—all as applied to the theories and phenomena of decision and judgment.

NRE 517 Doctoral Seminar in Information, Incentives, Games, and Contracts

3 credits. Staff.

An introduction to game theory and information economics for a broad audience—those who will construct (or just consume) game-theoretic models in applied fields of management (including accounting, finance, marketing, and organizational behavior) and applied fields of economics (including industrial organization, labor economics, macroeconomics, and international economics). The course emphasizes applications as much as pure theory; each step in the theory is illustrated by applications from management and economics before the next step in the theory is introduced. The wide variety of applications shows that similar issues arise in different fields and that the same game-theoretic tools can be applied in each setting.

FACULTY ROSTER

Adair, WendiLyn, Ph.D., Northwestern. Asst. Prof., Organizational Behavior

Babbes, George, Ph.D., U. of California at Berkeley. Asst. Prof., Marketing

Bailey, Warren B., Ph.D., U. of California at Los Angeles. Assoc. Prof., Finance

BenDaniel, David J., Ph.D., Massachusetts Inst. of Technology. Don and Margi Berens Professor of Entrepreneurship

Bierman, Harold, Jr., Ph.D., U. of Michigan. Nicholas H. Noyes Professor of Business Administration

Bloomfield, Robert J., Ph.D., U. of Michigan. Assoc. Prof., Accounting

Bradley, James R., Ph.D., Stanford U. Asst. Prof., Production and Operations Management

Conway, Richard W., Ph.D., Cornell U. Emerson Electric Co. Professor of Manufacturing Management, Prof., Management Information Systems, Director, Semester in Manufacturing

D'Souza, Julia, Ph.D., Northwestern U. Asst. Prof., Accounting

Dyckman, Thomas R., Ph.D., U. of Michigan. Ann Whitney Olin Professor of Accounting

Elliott, John A., Ph.D., Cornell U. Prof., Accounting, Associate Dean for Academic Affairs

Frank, Robert, Ph.D., U. of California at Berkeley. Professor of Economics

Greenberg, Donald P., Ph.D., Cornell U. Prof., Management Information Systems

Gukhal, Reddy, Ph.D., Columbia U. Asst. Prof., Finance

Hass, Jerome E., Ph.D., Carnegie-Mellon U. Prof., Finance and Business Strategy

Hilton, Ronald W., Ph.D., Ohio State U. Prof., Accounting

Hribar, S. Paul, Ph.D., U. of Iowa. Asst. Prof., Accounting

Isen, Alice M., Ph.D., Stanford U. S. C. Johnson Prof., Marketing

Jarrow, Robert A., Ph.D., Massachusetts Inst. of Technology. Ronald P. and Susan E. Lynch Professor of Investment Management, Prof., Finance and Economics

Johnson, Justin, Ph.D., MIT. Asst. Prof., Economics

Kadiyali, Vrinda, Ph.D., Northwestern U. Asst. Prof., Marketing and Economics

Lee, Angela, Ph.D., U. of Toronto. Asst. Prof., Marketing

Lee, Charles M. C., Ph.D., Cornell U. Prof., Accounting and Finance, Henrietta Johnson Louis Professor of Management, Director, The Park Center for Investment Research

Li, Haitao, Ph.D, Yale U. Asst. Prof., Finance

Libby, Robert, Ph.D., U. of Illinois. David A. Thomas Professor of Management, Prof., Accounting and Behavioral Science

Lind, Robert C., Ph.D., Stanford U. Prof., Economics, Management, and Public Policy

Mannix, Elisabeth, A., Ph.D., U. of Chicago. Assoc. Prof., Organizational Behavior

McAdams, Alan K., Ph.D., Stanford U. Assoc. Prof., Managerial Economics

McClain, John O., Ph.D., Yale U. Prof., Quantitative Analysis

Michaely, Roni, Ph.D., New York U. Assoc. Prof., Finance

Nelsen, Bonalyn, Ph.D., Cornell U. Asst. Prof., Organizational Behavior

Nelson, Mark W., Ph.D., Ohio State U. Assoc. Prof., Accounting

O'Connor, Kathleen, Ph.D., U. of Illinois. Asst. Prof., Organizational Behavior

O'Hara, Maureen, Ph.D., Northwestern U. Robert W. Purcell Prof., Management, Prof., Finance

Orman, Levent V., Ph.D., Northwestern U. Assoc. Prof., Management Information Systems

Peterson, Randall S., Ph.D., U. of California at Berkeley. Asst. Prof., Organizational Behavior

Rao, Vithala R., Ph.D., U. of Pennsylvania. Deane W. Malott Professor of Management, Prof., Marketing and Quantitative Methods

Robinson, Lawrence W., Ph.D., U. of Chicago. Assoc. Prof., Operations Management

Russo, J. Edward, Ph.D., U. of Michigan. S. C. Johnson Family Prof., Management, Prof., Marketing and Behavioral Science

Sally, David F., Ph.D., U. of Chicago. Asst. Prof., Organizational Behavior

Smidt, Seymour, Ph.D., U. of Chicago. Nicholas H. Noyes Professor of Economics and Finance, Director, Leadership Skills Program

Stayman, Douglas M., Ph.D., U. of California at Berkeley. Assoc. Prof., Marketing

Suwinski, Jan H., MBA, Cornell U. Prof., Business Operations

Swaminathan, Bhaskaran, Ph.D., U. of California at Los Angeles. Asst. Prof., Finance

Thomas, L. Joseph, Ph.D., Yale U. Nicholas H. Noyes Professor of Manufacturing, Director, Executive Development Program

Thomas-Hunt, Melissa, Ph.D., Northwestern. Asst. Prof., Organizational Behavior

Waldman, Michael, Ph.D., U. of Pennsylvania. Prof., Economics, Charles H. Dyson Prof., Management

Zhang, Rachel, Ph.D., Northwestern. Asst. Prof., Operations Management

Lecturers

Katz, Jan, Ph.D., Massachusetts Inst. of Technology. Sr. Lec., International Business and Marketing

Mink, Barbara E., M.A., Cornell U. Sr. Lec., Management Communications

Pike, Alan S., M.A., Cornell U. Sr. Lec., Management Communications

Rosen, Charlotte, Ph.D., Cornell U. Sr. Lec., Coordinator, Management Communications

Adjunct and Visiting Faculty

Grossman, Dale A., J.D., American U. Sr. Lec., Tax and Business Law

Nesheim, John L., MBA, Cornell U. Visiting Lecturer, President, Aladdin Systems, Inc.

Perez, Pedro D., Ph.D., Rochester Polytechnic Inst. Visiting Asst. Prof.

Schuler, Richard E., Ph.D., Brown U. Prof. Economics, Prof. Civil & Environmental Engineering

Sears, Peter A., J.D., Harvard U. Visiting Lecturer, Vice President, Business Investments, Smith Kline Beecham Corporation

Thomas, William, MBA, Harvard. Lec., Management, President, Capital Southwest

LAW SCHOOL

ADMINISTRATION

Lee E. Teitelbaum, dean of the law faculty and professor of law

John A. Siliciano, vice dean and professor of law

Gary J. Simson, associate dean for academic affairs and professor of law

Claire M. Germain, law librarian and professor of law

Harry B. Ash, associate dean for external relations

Richard D. Geiger, associate dean and dean of admissions, financial aid, and information technologies

Anne Lukingbeal, associate dean and dean of students

Karen V. Comstock, assistant dean for career services

Charles D. Cramton, assistant dean for graduate legal studies

John R. DeRosa, assistant dean for student affairs

Richard F. Robinson, assistant dean for administration and finance

Nan A. Colvin, registrar

LAW SCHOOL

The primary function of the Law School is to prepare attorneys for both public and private practice where they will render the highest quality of ethical and professional service to their clients and further legal progress and reform. The curriculum is designed to prepare students for admission to the bar in all American states and territories.

Ordinarily, a student who is admitted to the Law School must have a baccalaureate degree from an approved college or university. The course of study leading to the degree of Doctor of Law (J.D.) covers three academic years. Students may be admitted to a program of study leading to the degree of Doctor of Law "with specialization in international legal affairs." The Law School also offers to a limited number of students an opportunity to earn both a J.D. degree and an LL.M. degree in international and comparative law.

There are combined graduate degree programs with the Johnson Graduate School of Management, the Department of City and Regional Planning of the College of Architecture, Art, and Planning, the School of Industrial and Labor Relations, the graduate divisions in economics, history, and philosophy of the College of Arts and Sciences, the Université de Paris I (Pantheon-Sorbonne), and Humboldt University, as well as a special opportunity for highly qualified undergraduates in the College of Arts and Sciences to register in the Law School during their senior year.

Each year the graduate program of the Cornell Law School admits a limited number of students, generally all from abroad. The LL.M. degree (Master of Laws, Legum Magister) and the J.S.D. degree (Doctor of the Science of Law, Jurisprudentiae Scientiae Doctor) are conferred. A small number of law graduates may also be admitted as special students, to pursue advanced legal studies without seeking a degree.

For further information, refer to the Law School catalog, which may be obtained from the Office of the Registrar, Myron Taylor Hall.

FIRST-YEAR COURSES

LAW 500 Civil Procedure
Fall and spring. 6 credits. K. M. Clermont, B. J. Holden-Smith, F. F. Rossi.
An introduction to civil litigation, from commencement of action through disposition on appeal, studied in the context of the federal procedural system. Also, a detailed consideration of federalism and ascertainment of applicable law; jurisdiction, process, and venue; and former adjudication.

LAW 502 Constitutional Law
Fall. 4 credits. T. Eisenberg, S. L. Johnson, S. H. Shiffrin, G. J. Simson.
A study of basic American constitutional law, including judicial review, some structural aspects of the Constitution as developed particularly in light of the passage of the Civil War amendments, and certain of its rights provisions.

LAW 504 Contracts
Fall and spring. 6 credits. R. A. Hillman, R. S. Summers, W. F. Taylor.
An introduction to the nature, functions, and processes of exchange, contract, and contract law. The course focuses on the predominant rules and principles governing contract and related obligation, including the substantive reasons underlying the rules and principles.

LAW 506 Criminal Law
Spring. 4 credits. S. D. Clymer, S. P. Garvey.
An introductory study of the criminal law, including theories of punishment, analysis of the elements of criminal liability and available defenses, and consideration of specific crimes as defined by statute and the common law.

LAW 508 Legal Methods
Fall and spring. 4 credits. P. S. Anderson, J. B. Atlas, C. D. Bond, E. M. McKee, A. J. Mooney.
Legal Methods is a full-year course designed to introduce first-year students to lawyering skills, with primary emphasis on legal writing, analysis, and research. In the context of a law office, students create some of the essential legal writings that lawyers produce. Students develop their oral and written advocacy skills and start thinking about litigation strategy. At the end of the year, the students argue their case. Instruction occurs in small sections of approximately 37 students and in individual conferences.

LAW 512 Property
Spring. 4 credits. G. S. Alexander, R. E. Atkinson, Jr.
An investigation of the law's protection of ownership, including the beginnings of property, legal and equitable estates, concurrent ownership, and public and private regulation of land use.

LAW 515 Torts
Fall. 4 credits. J. A. Henderson, Jr., D. A. Kysar, J. A. Siliciano.
An introduction to the principles of civil liability in the tort field: intentional wrongs, negligence, and strict liability. Attention is also given to the processes by which tort disputes are handled in our legal system.

GRADUATE COURSE

LAW 621 Contracts in a Global Society
Fall. 3 credits. Limited to graduate students. S. J. Schwab.
This course is designed for foreign-trained lawyers who are familiar with basic contract law in their own country. It surveys the Anglo-American common law of contracts and related civil obligations. The pedagogic approach focuses on the case method and is Socratically based, similar to the traditional first-year course in Contracts.

LAW 676 Principles of American Legal Writing
Fall. 2 credits. Limited enrollment. Limited to graduate students. K. Silverstein.
This course provides foreign-trained lawyers with an introduction to the essential principles of legal writing in the United States and an opportunity to practice some of the forms of writing common to American legal practice. Students prepare such documents as client letters and memoranda in the context of representing a hypothetical client. Students also learn and practice various research strategies.

UPPERCLASS COURSES

LAW 601 Accounting for Lawyers
Spring. 2 credits. J. G. Davis.
This course is designed to introduce students to the basic concepts and fundamentals of financial accounting. It focuses on: accrual accounting concepts, principles and conventions; the presentation of financial statements (balance sheets, income statements, statements of cash flow); the interpretation and analysis of financial statements; and the use and misuse of accounting information. The goal of the course is to enable students to critically review a company's financial statements. The course is intended primarily for students with little or no prior background in bookkeeping or accounting.

LAW 602 Administrative Law: The Law of the Regulatory State
Fall, spring. 3 credits. Limited enrollment. C. R. Farina, D. B. Spence.
An introduction to the constitutional and other legal issues posed by the modern administrative state. Topics include: procedural due process, separation of powers, procedural modes of administrative policymaking; judicial review of agency action; and the oversight and control relationships between agencies and Congress or the President. The course provides a working familiarity with the fundamentals of administrative procedure, as well as a larger inquiry into the role of agencies in our constitutional system—and the effect of legal doctrine on shaping that role.

LAW 608 American Indian Law
Fall. 2 credits. D. T. White.
The class is intended to provide a basic understanding and overview of the fundamental principles of Indian law. It examines the origins of Indian law, historical development of the law, tribal sovereign powers, tribal-state conflicts, Indian water rights, economic development, and hunting and fishing rights. A number of recent cases are discussed in detail. Students are graded on the basis of short papers, rather than a final exam.

LAW 610 Antitrust Law
Spring. 2 or 3 credits. Students who have taken an antitrust course in the Paris Program may take this course for 2 credits. G. A. Hay.
A consideration of the basic antitrust rules enacted by Congress and amplified by the courts to protect competitive markets and limit the exercise of monopoly power. Topics include: price fixing, boycotts, and market allocation agreements among competitors; agreements between suppliers and customers; joint ventures; attempts to monopolize and monopolization; price discrimination; and mergers.

LAW 611 Arbitration
Fall. 2 credits. Limited enrollment. F. K. Moss.
Arbitration is the principal method of resolving disputes between unions and employers, between securities brokers and their clients, and under international business agreements, and is gaining favor in many other areas. This course familiarizes students with arbitration practice in a variety of fields through readings of simulation exercises and other methods.

LAW 613 Bankruptcy
Spring. 3 credits. Prerequisite: Students who have taken Debtor-Creditor Law are ineligible for this course. T. Eisenberg.
Selected topics in the law of bankruptcy. An overview of the various bankruptcy chapters and a detailed study of the bankruptcy provisions of most general applicability. The relationship between the rights of an Article 9–secured creditor and the bankruptcy trustee's power to avoid liens. Related topics in the enforcement of money judgments and the law of fraudulent conveyance.

LAW 615 Children, Parents, and the State
Fall. 2 credits. L. E. Teitelbaum.
This course explores legal and social understandings of the rights of children, parents, and the state with respect to issues such as access to and control over the content of education, authority regarding health care, claims to speech and expression, and procreative decisions. The course also examines the operation of rights in connection with juvenile court jurisdiction over neglect and abuse, delinquency, and status offenses.

[LAW Commercial Law
3 credits. Not offered 2001–2002.
Examines a variety of commercial dealings and focuses on Articles 2 and 3 of the Uniform Commercial Code, with some coverage of other Articles and the Convention on Contracts for the International Sale of Goods. The course is designed to give students an understanding of commercial statutes and to inform them about many of the underlying commercial transactions to which the law relates.]

LAW 617 Comparative Public Law
Fall. 2 credits. Limited enrollment. Y. M. Cripps.
This course focuses on a comparison between the constitutional and administrative law of the United States and the United Kingdom and the structure and influences of the legislative, executive, and judicial branches in those systems. Continental public law concepts such as legitimate expectations and proportionality are among those that are examined in relation to the ways in which they have influenced the development of British and EU public law, and questions are raised as to whether such concepts have a role to play in the constitutional and administrative law of the United States. The course involves presentation and discussion of papers in class in lieu of a final exam. Each student writes a 10–15 page paper that is presented in class as well as very brief written critiques of the other students' papers.

LAW 619 Conflict of Laws
Spring. 3 credits. G. J. Simson.
A study of the methods used by courts to decide the applicable law in cases that, in their parties or events, involve more than one state or country. Attention is given to the due-process limitations on jurisdiction, a state's obligation under the full-faith-and-credit clause to respect sister-state judgments, and conflicts between federal and state law.

LAW 620 Constitutional Law II: The First Amendment
Spring. 3 credits. S. H. Shiffrin.
A comprehensive discussion of freedom of speech, press, and association. The free-exercise-of-religion clause and the establishment clause of the First Amendment are treated less extensively.

LAW 622 Copyright
Fall. 3 credits. P. W. Martin.
This course provides students with a comprehensive overview of the U.S. copyright law. It covers the substantive and procedural requirements for qualifying for copyright protection, then provides an in-depth study of the rights granted to authors under this law, the standards for judging copyright infringement, public policy limitations on the scope of copyright interest (such as the fair use defense), and remedies available to successful litigants. Issues raised by new information technologies and recent amendments addressing them receive special attention. The course also provides some comparative and international copyright law components.

LAW 623 Corporate and White Collar Crime
Fall. 3 credits. S. P. Garvey.
White collar crime is one of the fastest growing areas of specialization in the legal profession. The collapse of the savings and loan industry, rampant fraud in the nation's financial markets, and systemic corruption in the health care industry have contributed to a dramatic increase in federal white collar crime prosecutions over the past twenty years. This course examines some of the principal statutes that are used to prosecute corporate and white collar crime. We consider theories of liability including traditional white collar offenses like mail and wire fraud, insider trading, perjury, obstruction of justice, and bribery. They also include more recent entries into the field such as RICO, money laundering, and laws enacted to combat government contract fraud. The course also provides an introductory look at the Federal Sentencing Guidelines.

LAW 624 Corporate Finance and Emerging Markets
Spring. 3 credits. A. B. Kingston.
The course examines legal aspects of various types of corporate finance transactions in emerging markets, and the role of commercial lawyers in these transactions. The course focuses on corporate finance transactions occurring in the midst of the transformation of former Soviet bloc states from command to market economic systems. Transactions in emerging markets pose different political, economic, social, and legal challenges from those arising from transactions in other, more predictable, legal systems. At the same time, the globalization of the world economy and the profound shortage of capital in many emerging markets make this one of the fastest growing fields of commercial law.

LAW 625 Corporations
Fall or spring. 4 credits. Limited enrollment. J. R. Macey, T. Ruskola.
An introduction to the business corporation laws affecting the rights and roles of corporate boards of directors, senior executive officers, and shareholders, with an emphasis on large, publicly traded firms. Shareholders' economic interests and shareholders' limited participation rights in corporate decision making are examined. The latter part of the course focuses on directors' and officers' fiduciary obligations to shareholders, examining the operation of these duties in a variety of settings and transactions. Issues relating to the roles and functions assumed by corporate attorneys (with respect to their clients) and the role of business corporations within society are also addressed. No previous business knowledge is assumed.

LAW 627 Criminal Procedure
Fall. 3 credits. J. H. Blume.
This course surveys the law of criminal procedure, with emphasis on the constitutional constraints that regulate the pretrial stage of the criminal process. More specifically, the course focuses on the law of interrogations and confessions, the admissibility of evidence, and on the right to counsel throughout all stages of the criminal process.

LAW 629 Current Topics at the Crossroads of Law and Finance (also NBA 551)
Spring. 3 credits. J. R. Macey, M. O'Hara.
Financial institutions of all kinds, whether they are formally known as insurance companies, banks, investment banks, mutual funds, or pension funds, invest money on behalf of clients in a wide variety of investment vehicles. This course looks at the way that these financial institutions are treated from

both a legal and an economic perspective. Emphasis is placed on the intersections between modern financial theory and legal analysis. Topics covered include insurance, bank regulation and reform, securities markets, investment banking, and pensions.

[LAW Death Penalty in America: A Survey
2 credits. Not offered 2001–2002.
The course surveys the law relating to the administration of the death penalty.]

LAW 630 Directed Reading
Fall or spring. 1 or 2 credits. Arrange directly with instructor. See Law School Registrar.
An examination of a topic through readings selected by arrangement between the instructor and an individual student or group of students (not exceeding eight).

LAW 632 Employment Discrimination Law: Past, Present, and Future Approaches to Achieving Equal Opportunity
Fall. 2 credits. J. R. Gaulding.
By now most people know that it is illegal to discriminate in the workplace on the basis of certain factors such as race, sex, religion, age, or disability. But what does this really mean? This course explores this question in historical context, highlighting trends in federal law under Title VII, the Americans with Disabilities Act (ADA), and the Age Discrimination in Employment Act (ADEA). It examines some key doctrinal puzzles (e.g., Why does unconscious bias qualify as "intentional discrimination"? and, Why aren't all persons fired on the basis of their disability protected by disability law?) and considers the impact of economic and cognitive psychology research on our understanding of the scope and purpose of equal opportunity law.

LAW 633 Employment Law
Spring. 3 credits. S. J. Schwab.
Survey of major statutory schemes, constitutional principles, and common law doctrines that affect the employer-employee relationship in the public and private sectors, other than laws regulating union formation and collective bargaining, which are covered in Labor Law. Topics covered include unjust dismissal, drug testing, free speech, privacy, and antidiscrimination laws. In addition, the course provides an overview of major statutory schemes affecting the terms and conditions of employment, such as workers' compensation, the Fair Labor Standards Act, and the Occupational Safety and Health Act.

LAW 636 Environmental Law
Spring. 3 credits. D. B. Spence.
The course surveys the major environmental laws, with a primary focus on federal statutes (CERCLA, RCRA, NEPA, the Clean Water Act, the Clean Air Act, and the Endangered Species Act). The course lays out the various governmental tools used to address the problems of environmental degradation and discusses the value of these tools. Special attention is paid to the economic, social, and political obstacles to efficient regulation of the environment.

LAW 638 Estate Planning
Fall. 2 credits. Limited enrollment. A. F. Grable.
This course covers problems involving planning and drafting for the transfer of property, both during lifetime and at death, taking into account relevant property law and federal and state income, gift, and estate taxes.

LAW 640 Evidence
Fall or spring. 3 credits. S. D. Clymer, F. F. Rossi.
The rules of evidence in civil and criminal cases with emphasis on relevance, authentication, witnesses, experts, and hearsay. The course focuses on the Federal Rules of Evidence, with some attention to how they diverge from the common law.

LAW 641 The Evolving Law of Patents: Patents and Biotechnology
Fall. 2 credits. Y. M. Cripps.
This course focuses on the ways in which biotechnological developments are affecting traditional notions of property, intellectual property, and information. In addition to patent law, other forms of property protection, such as copyright, are examined through a biotechnological prism and compared with the way in which they operate, for example, in relation to the Internet and digital technology. There is also an examination of whether genetically engineered organisms and other biotechnological products should be granted intellectual property protection either within the existing frameworks of intellectual property law or under some new regime designed specifically for that purpose. As is inevitable in any discussion of intellectual property law, international perspectives are important. The course involves presentation and discussion of papers in class in lieu of a final exam. Each student writes a 10–15 page paper that is presented in class as well as very brief written critiques of the other students' papers.

LAW 642 Family Law
Spring. 3 credits. M. A. Fineman.
In this course we use scientific and social scientific information to evaluate our assumptions and beliefs and to call into question the appropriateness of a number of current state laws regulating families. We examine the evolution of our society's understanding of and expectations for marriage, and shifts over the past several decades in the nature of and justification for state regulation of that institution. Substantial attention is paid to the social and legal consequences of marriage dissolution, including an examination of the imposition of a gender neutrality-gender equality model in the divorce context.

LAW 643 Federal Courts
Spring. 4 credits. Prerequisite: Constitutional Law and second semester of Civil Procedure. Students without such background should consult with instructor. B. J. Holden-Smith.
This course examines the various constitutional and judge-made doctrines that control access to the federal courts to vindicate federal rights. It is particularly valuable for those planning a career in public interest or the public sector, anyone else expecting to litigate extensively in federal court, and students who have or hope to obtain a judicial clerkship. Topics covered include: case of controversy limitations, including standing; constitutional and statutory limits on jurisdiction; causes of action for constitutional and statutory rights, including 42 U.S.C.§1983 and *Bivens* actions; and bars to such actions, including the various abstention doctrine and the emerging law on 11th Amendment and sovereign immunities.

LAW 644 Federal Income Taxation
Fall or spring. 4 credits. Limited enrollment. W. C. Gifford, R. A. Green.
A basic course designed to develop understanding of tax concepts and ability to work effectively with the Internal Revenue Code, regulations, cases, and other tax materials.

[LAW Feminist Jurisprudence
3 credits. Limited enrollment. Not offered 2001–2002.
This course examines the role of law, and, more generally, the role of the state, in perpetuating and remedying inequities against women. We study several paradigmatic feminist legal theories, including equality, difference, dominance, and various antiessentialist theories (e.g. intersectional, poststructuralist). Among the questions considered are: How does the law help to construct gender? In what ways does it interact with cultural images and assumption regarding women to perpetuate women's disadvantaged status in society? To what extent can a set of institutions implicated in women' marginalization be used to remedy it? Can a legal system predicated on the liberal assumption of a unitary, prepolitical, autonomous self accommodate feminist accounts of social construction, constrained "choice," or decentered subjects? What methods have feminists used to argue in and about the law? And, do these methods themselves have the potential to transform legal thinking?]

LAW 647 Health Law
Fall. 3 credits. L. I. Palmer.
This course examines the role of law and policy in the health care industry. Students are invited to take a "systems approach" to the study of the role of law in arriving at coherent policy solutions for a host of dilemmas facing a rapidly evolving industry. Students are asked to consider if a particular statute, regulation, or judicially crafted legal doctrine is consistent with new developments or any public policy towards health care. Topics covered include: access to health care; purchasing health care; commercialism vs. professionalism; the antitrust challenge to professional dominance; changing institutional providers; and public and industry-sponsored quality control.

LAW 649 Initial Public Offerings and Acquisitions
Spring. 3 credits. Limited enrollment. Prerequisite: Corporations. Z. J. Shulman.
An in-depth look at initial public offerings and acquisitions from a practitioner's point of view. With respect to initial public offerings, the course covers: the applicable statutory framework, pre-offering corporate preparations (such as the implementation of poison pills and stock option plans), the due diligence process, the implementation of corporate governance policies appropriate for a public company, the offering registration process, liability under federal securities laws, the Securities and Exchange Commission review process, underwriting arrangements, selection of a trading forum (i.e., NYSE, NASDAQ, or AMEX), and the transaction closing. Regarding mergers and acquisitions, the course explores: financing alternatives, accounting treatment, due diligence, choosing an appropriate transaction structure (i.e., stock versus asset sale), public company transaction issues (i.e., antitakeover matters and fiduciary duty concerns), and crucial legal aspects of the acquisition, such as letters of intent,

successor liability, continuity of employees, and noncompetition agreements.

LAW 652 International Business Transactions
Fall. 3 credits. J. J. Barceló III, with D. A. Ridgway.
An examination of the unique legal features of business transactions across national boundaries. The first half of the course deals with the private law of international transactions. The topics covered include: choice of law in the United States and Europe concerning international sales; the U.N. Convention on the International Sale of Goods; financing international transactions through letters of credit; and international dispute settlement (litigation and arbitration). The second half of the course deals with public regulatory law, including an overview of the World Trade Organization (WTO/GATT) with some attention to the trade-environment conflict; fair and unfair trade rules (escape clause, subsidies and countervailing duties, and antidumping); the trade consequences of intellectual property rights; and international antitrust.

LAW 653 International Commercial Arbitration
Fall. 3 credits. J. J. Barceló III, with D. A. Ridgway.
A study of arbitration as a dispute resolution process for international trade and business disputes. The course analyzes ad hoc and institutional arbitration, the authority of arbitral panels, enforcement of agreement to arbitrate, challenging arbitrators, procedure and choice of law in arbitral proceedings, and enforcement of international arbitral awards. The course gives special attention to the international convention on the recognition and enforcement of international arbitral agreements and awards (New York Convention) and the UNCITRAL (U.N. Commission of International Trade Law) arbitral rules and model law. It focuses on commercial arbitration as an international phenomenon and not on arbitration under any particular national system.

LAW 655 International Human Rights
Spring. 3 credits. Recommended prerequisite: Public International Law.
D. Wippman.
This course explores the development and effectiveness of international legal rules governing the conduct of a state toward people within its jurisdiction. Topics include the substantive norms of human rights, and their philosophic basis; the mechanisms for the protection of human rights, such as the United Nations, international human rights treaty bodies, and domestic courts; and current issues such as the doctrine of humanitarian intervention, the status of indigenous peoples, and human rights during armed conflicts.

LAW 657 International Organizations and Human Rights Institutions
Fall. 3 credits. M. Ndulo.
The course provides a comprehensive legal analysis of problems concerning membership, the structure of the United Nations organs, and a variety of other international organizations. It considers their functions and acts taking into account the United Nations Charter and texts establishing these organizations. The course further considers the structure, jurisdiction, and functions of the International Court of Justice and the International Criminal Court. It also examines the international machinery for the protection of human rights in the world community including the United Nations Human Rights Committee, the European Court of Human Rights, and the Inter-American Court of Human Rights. Relevant decisions of these courts and of municipal courts are studied as well as basic documents.

[LAW International Protection of Intellectual Property
2 credits. Recommended prerequisite: Intellectual Property. Not offered 2001–2002.
This course studies intellectual property rights in the international legal system. A general introduction reviews the international protection of patents, trademarks, industrial design, and copyright. The starting and focal point is the Agreement on Trade Related Aspects of Intellectual Property (TRIPS) adopted in the framework of the World Trade Organization (WTO). The international protection of intellectual property is studied through consideration of the TRIPS agreement and the several international conventions the observation of which is made mandatory for WTO Members by TRIPS. Also examined are issues of international court jurisdiction and applicable law in the area of intellectual property.]

LAW 658 International Taxation
Fall. 3 credits. Prerequisite: Federal Income Taxation. W. C. Gifford.
This course examines the U.S. income tax treatment of foreign investment and business operations in the United States, as well as the treatment of U.S. investment and business operations abroad. The course focuses on international tax jurisdiction and on the methods by which the United States relieves international double taxation, both by statute and through income tax treaties.

LAW 659 Introduction to Chinese Law and Jurisprudence
Fall. 2 credits. T. Ruskola.
This course is an introduction to the comparative study of Chinese law and legal thought. It starts by analyzing the tradition of imperial Chinese law and its theoretical foundations, and then turns to early twentieth-century law reforms and the introduction of socialist law and jurisprudence. The course ends with the study of post-Mao law reforms and their implications for the future of Chinese law. In addition to its substantive focus, the course considers methodological problems involved in the cross-cultural study of law. Some of the more general themes that run throughout the course include the following: To what extent is "law" a useful analytical category in Sino-American comparison? How is law related to capitalism and socialism? To culture and socio-economic organization more generally? How and why has Chinese law changed over time? What happens when Eastern and Western legal systems come in contact with each other?

LAW 660 Labor Law
Fall. 3 credits. K. V. W. Stone.
A study of collective bargaining, including the process of union formation, legal regulation of strikes and other economic weapons, negotiation and enforcement of collective agreements, the duty of fair representation, the application of antitrust law to union activity, and the relationship between federal labor law and local laws regulating the employment contract.

LAW 661 Land-Use Planning
Fall. 3 credits. E. F. Roberts.
A study of the legal matrix as a method of controlling the environment in which people live and work, including public nuisance as a device to control the town environment; zoning as a control mechanism; conflict between zoning as a plan for growth and as a brake on development; subdivision controls; planning as a respectable government activity; the dynamics of planning, zoning, subdivision controls, and private land-use controls; the rehabilitation-of-center-city syndrome; and future prospects of maintaining a decent environment in a class driven multilingual and culturally tribal society that lacks a genuine moral consensus.

LAW 662 Law, Language, and Ethnic and Racial Identity
Spring. 2 credits. V. Santiago-Irizarry.
This course examines the influential role that language has in the law and in legal processes, especially in constructing ethnic and racial identity in the United States. We approach the law from a critical anthropological perspective, as a cultural system rather than as an abstract collection of rules, norms, and procedures, to examine how legal processes contribute to the creation and maintenance of asymmetrical power relations. Since racism and racialization have been salient experiences of inequality in the United States, they provide us with a particularly appropriate analytical focus. Course material draws on anthropological, linguistic, and critical race theory as well as ethnographies, legislation, and legal cases to guide and document our analyses.

LAW 664 Law of Branding: Trademarks, Trade Dress, and Unfair Competition
Spring. 2 credits. N. D. St. Landau.
Fundamental trademark, trade dress, and unfair competition laws are examined in the context of assisting clients to execute branding and marketing strategies. Special focus is given to branding as it relates to: "consumer products companies;" the impact of e-business and the Internet on branding strategies and acquisitions; and complex proof issues in trademark and domain name litigation. Marketing strategies embody fundamental and long-established principles of the trademark laws. The Lanham Act is used to address issues ranging from confusingly similar words and designs, to false and unsubstantiated advertising claims, and public appropriation—and misappropriation—of long-established corporate icons in today's e-commerce world. This course examines the basics of this rapidly changing body of law.

LAW 667 Lawyers and Clients
Spring. 3 credits. Satisfies the professional responsibility requirement.
D. A. Kysar.
A survey and critique of: the law governing the practice of law and the legal profession's norms concerning the lawyer-client relationship; the social functions of lawyers; the modes and patterns in which legal services are or are not made available to the public; and ethical theory relating to lawyer role and conduct.

LAW 668 Legal Aspects of Foreign Investment in Developing Countries
Spring. 3 credits. M. B. Ndulo.
This course studies legal aspects of foreign investments in developing countries. It seeks to identify legal problems that are likely to

affect a commercial investment in a developing country. Inter alia, it deals with the public international law principles and rules governing the establishment by foreign businesses of various factors of production (persons and capital) on the territory of other states and the protection of such investments. Thus, the course includes a discussion of the following topics: economic development and foreign capital; obstacles to the flow of investments to developing countries; guarantees to investors and investment codes; bilateral treaties; nationalization; joint ventures; transfer of technology; arbitration; investment insurance; unification of trade law; and the settlement of investment disputes.

LAW 669 The Legal Profession
Spring. 3 credits. Satisfies the professional responsibility requirement.
R. E. Atkinson, Jr.
This course is designed to give students a working knowledge of the regulation of the practice of law. The course explores both the policies served by that system of regulation and the problems encountered in its design and implementation. Actual and hypothetical problem situations are analyzed in light of the Code of Professional Responsibility, the Model Rules of Professional Conduct, and, less extensively, several schools of social science and moral philosophy.

LAW 670 Legislation
Spring. 3 credits. L. I. Palmer.
This course explores various theories of legislation by studying how statutes become a source of public policy, how judges interpret them, and how lawyers draft them. Drafting exercises are used throughout the course to determine to what degree legislation can be used to reform law or to remedy particular social problems.

LAW 671 Media Law
Fall. 2 credits. J. P. Due.
This course examines various aspects of media law. It begins by considering the scope of First Amendment protection of the media. It then focuses on legal issues arising from news gathering and moves on to issues arising from publication, such as defamation, publication-related privacy torts, and rights of publicity. The course briefly examines basic copyright concepts in order to lay the groundwork for close study of disputes over electronic publishing rights to collective works. Various recent landmark developments in the case law are highlighted.

LAW 672 Mergers and Acquisitions
Fall. 2 credits. Limited enrollment.
R. F. Balotti.
This course examines the principal business and legal issues in the purchase and sale of publicly held businesses. Emphasis is placed on the duties of directors in the acquisitions of publicly held companies (including hostile takeovers).

LAW 673 Negotiation and Mediation: Alternative Dispute Resolution and Non-Traditional Approaches to Conflict.
Spring. 2 credits. Limited enrollment.
J. Meyer.
This course inquires into the theories and practice of conflict resolution and focuses on non-traditional, cutting-edge alternatives to the traditional litigation process. The course introduces students to the spectrum of ADR processes and teaches interviewing and counseling, negotiation and mediation as skill sets. A variety of approaches are used to analyze issues and develop skill sets, including lecture/discussion, video tapes, negotiation exercises and simulated mediations.

LAW 674 Negotiations
Spring. 3 credits. Limited enrollment.
S. C. Kurvilla.
The purpose of this course is to provide opportunities for class participants to develop their negotiating abilities for use in organizational and other settings. The course is premised on the assumption that negotiating concepts are best learned through practice which is grounded in rigorous analysis and reflection. While theoretical principles and concepts from various reference disciplines (such as social psychology, sociology, and economics) are presented through lectures and readings, this course focuses primarily on improving practical skills. Class participants not only learn to enhance their individual abilities in dyadic and group situations, but also to analyze contexts for the most effective application of these skills.

LAW 675 Partnership Taxation
Spring. 2 credits. R. A. Green.
This course provides an introduction to the taxation of partnerships and limited liability companies. The course focuses on the tax issues arising upon the formation, operation, and liquidation of a partnership or LLC.

LAW 677 Problems in Commercial Law: Sales, Leases, and Electronic Commerce
Spring. 3 credits. W. F. Taylor.
This course explores contemporary issues in Commercial Law with particular emphasis on sales, leases and electronic transactions. This exploration is pursued primarily through the problem solving method with the objective of encouraging students to concentrate on the exact statutory language in the Uniform Commercial Code (UCC) and other related federal statutes. Because of the recent changes in the commercial world around the UCC such as electronic contracts, this course selectively integrates materials on the Uniform Electronic Transactions Act (UETA), the Uniform Computer Information Transactions Act (UCITA) and the United Nations Convention on Contracts for the International Sale of Goods (CISG). This course extends the ideas explored in the traditional Contracts course.

[LAW Private Justice: Arbitration and Other Forms of Alternative Dispute Resolution
4 credits. Limited enrollment. Not offered 2001–2002.
Arbitration has become a major aspect of legal practice in such fields as labor law, commercial law, securities law, family law, and other areas. This course examines the developing law of arbitration and the relationship between private arbitration and the judicial system. It examines issues such as the enforceability of arbitration agreements, arbitral due process, judicial review of arbitration awards, and the effect of arbitration on statutory rights. It also examines other forms of alternative dispute resolution including: mediation, small claims courts, and the new mandatory arbitration requirements of some federal and state judicial systems. The course focuses on the law of alternative dispute mechanisms and includes six simulation and problem-solving sessions.]

LAW 678 Products Liability
Fall. 3 credits. J. A. Henderson, Jr.
Course involves applications of products-liability doctrine and theory to a variety of problems drawn from or closely approximating actual litigation. Serves as an overview of the relevant case law, statutes, and administrative regulations, including the new *Restatement, Third, of Torts: Products Liability.*

LAW 680 Public International Law
Fall. 3 credits. D. Wippman.
An introduction to the legal rules governing the conduct of states vis-á-vis other states, individuals, and international organizations, with reference to major current events and issues. Topics include the nature, sources, and effectiveness of international law; the establishment and recognition of states; principles concerning state sovereignty, territory, and jurisdiction; the law of treaties; state responsibility; international criminal law; and human rights. Special attention is given to the law governing the use of force.

LAW 681 Securities Regulation and the Regulation of Financial Intermediaries
Fall. 3 credits. J. R. Macey.
This course covers the federal rules relating to the public offering of securities, secondary market trading of securities, and the regulation of commercial banking, investment banking, and investment companies (mutual funds). Emphasis is placed on the relationship between the various forms of financial intermediation and capital formation, and on the role of these activities in corporate governance. The increasing internationalization of the capital markets, and the public policy issues related to globalization, are also discussed.

LAW 682 Sex Discrimination and the Law
Spring. 3 credits. R. L. Lieberwitz.
This course examines various legal issues relevant to discrimination on the basis of sex. Among the problems analyzed are: sexual harassment; pornography; reproductive rights; prostitution; work-family conflict; inequality in employment opportunities; gay and lesbian rights; welfare rights; and affirmative action

LAW 683 Social Security Law
Spring. 3 credits. P. W. Martin.
The course focuses especially on how Social Security's benefit rules relate to employment, families, and household composition and how its procedures address the challenge of adjudicating the massive numbers of benefit claims that arise each year. It introduces the general features of the Social Security Act's entitlement, benefit formulae, and procedural rules; highlights those that pose the greatest difficulty to administrators and advocates; and surveys current proposals for change.

LAW 684 Sports Law
Spring. 2 credits. Recommended prerequisites: Antitrust Law and Labor Law.
W. B. Briggs.
The course traces the development of sports law in the United States. Particular attention is given to the relationship of sports with antitrust and labor law. Contemporary issues involving arbitration, collective bargaining, amateur athletics, agents, torts, criminal law, and constitutional law are addressed.

LAW 686 Supervised Teaching
Fall or spring. 1 or 2 credits. Arrange directly with instructor. See Law School Registrar.

LAW 687 Supervised Writing
Fall or spring. 1, 2, or 3 credits. Arrange directly with instructor. See Law School Registrar.

LAW 688 Supervised Teaching and Supervised Writing—Legal Methods Honors Fellows Program
Fall. spring. 4 credits for full year. Prerequisite: Application Process.
Legal Methods Honors Fellows serve for the full year as teaching assistants in the Legal Methods course and as mentors to first-year law students. With training and guidance from the Legal Methods faculty, the Honors Fellows work closely and one-on-one with the students on the various writing projects. In addition to meeting regularly with students, and reviewing and critiquing their work, Honors Fellows may help design writing and research assignments, prepare model memoranda, participate in role-playing exercises during mock interviewing or negotiating sessions, judge oral arguments, and assist the librarians with research training. The Honors Fellows are also responsible for teaching and holding classes on the Bluebook.

Additionally, Honors Fellows serve as mentors to the entering students to help them make the most of the foundational first year of law school. The Fellows hold workshops on basic law school skills and, during the spring semester, under the direction of the Dean of Students, a small group of Fellows may tutor first-year law students.

LAW 689 Taxation of Corporations and Shareholders
Fall. 3 credits. Prerequisite: Federal Income Taxation. R. Green.
This course examines the federal income taxation of corporate structure and transactions, including incorporation, dividends, redemptions, liquidations, divisions, and reorganizations.

LAW 692 Trial Advocacy
Spring. 4 credits. Prerequisite: Evidence. Limited enrollment. F. F. Rossi.
This course is devoted to the study of the trial. Fundamental skills are taught in the context of challenging procedural and substantive law problems. Each stage of the trial is examined: jury selection, opening, objections, direct examination, cross-examination, impeachment, expert witnesses, child witnesses, summation, and pretrial. In addition to exercises every week on a particular segment of a trial, the student also does a full-day jury trial at the completion of the course. Video equipment is used to teach and critique student performances. There are frequent written assignments.

LAW 694 Trusts and Estates
Fall. 4 credits. G. S. Alexander.
The course surveys the basic law of succession to property, including wills and intestate succession, and the law of trusts. Among the recurring themes of the course are strict and lenient enforcement of formal requirements and methods of interpretation. This is not a course on estate taxation.

PROBLEM COURSES AND SEMINARS

All problem courses and seminars satisfy the writing requirement. Limited enrollment.

[LAW Advanced Civil Procedure
3 credits. Not offered 2001–2002.
A study of complex civil litigation involving multiple parties and multiple claims. Topics include joinder of parties and claims, impleader, interpleader, class actions, and intervention.]

LAW 703 Advanced Legal Research
Spring. 3 credits. C. M. Germain and staff.
Teaches cutting-edge research techniques to prepare students for practice in the law office of the future. Focuses on desktop electronic legal research, and covers U.S., international, and foreign law, as well as multidisciplinary research. The course is designed to teach students, whose careers will begin in a period of information transition, how to handle traditional and electronic sources and formats and make efficient choices.

LAW 705 African Americans and the Supreme Court
Spring. 3 credits. B. J. Holden-Smith.
Beginning with its first decisions related to the slavery question, the Supreme Court has at times aided and at other times hindered efforts to afford African Americans full citizenship. This seminar explores the relationship between blacks and the Supreme Court by examining the major Court decisions affecting African Americans and attempting to understand those decisions in their historical contexts. The course begins with a review of the background and meaning of the constitutional provisions pertaining to the status of blacks in the new nation and ends with an intensive look at *Brown v. Board of Education*.

LAW 707 American Legal Theory
Fall. 3 credits. R. S. Summers.
The fall 2001 topic for this seminar is the appropriate form of basic types of legal phenomena such as criteria of valid law (for both publicly and privately made law), statutory rules, accepted methods of statutory interpretation, the principle of stare decisis and common law rules, adjudicative processes, limitations on judicial power to modify rules, and the formal characteristics of the legal system viewed as a whole. American law lacks appropriate form in many important ways and a heavy price is paid for this. However, appropriate legal form and its distinctive underlying rationales (general legal values) profoundly affect the overall content of law and its practice by lawyers in the American as well as other legal systems. Such formality and its rationales have as much or more of a claim to primacy as the essence of law than do problem-specific policies that also inform the law's content. In this seminar, there is equal emphasis on practical skills and theory.

LAW 708 Appellate Advocacy
Fall. 3 credits. J. B. Atlas.
This seminar examines the law and skills that are integral to representing a client on appeal. The seminar is loosely divided into three central parts: (1) the principles of appellate law, including standards of review, the preservation doctrine, harmless-error analysis, and remedies; (2) the unique role of appellate counsel, including ethical duties to the court and client; and (3) appellate skills, including client counseling, issue selection, brief-writing, and oral argument. Miscellaneous additional topics for exploration include motion practice, leave applications, and the role of law clerks in the decision-making process. Students read and analyze the record of a criminal proceeding, assess and research potential appellate issues, and prepare a brief (including a rewrite) for either the prosecution or defense. Each student also orally argues the case in a moot-court session.

LAW 709 Biblical Law
Fall. 3 credits. C. M. Carmichael.
Analysis of law and narrative in the Bible from the perspective of ancient law and legal history. Topics include the nature of the law codes (e.g., hypothetical formulation versus statutory law), legal issues in the narratives (e.g., law of adultery and women's rights), law and morality (e.g., Ten Commandments), law and religion (e.g., institutions guaranteed by the law but condemned by religious authority), the transformation of extralegal relations into legal ones (e.g., with the introduction of money), legal interpretation in antiquity (e.g., Sermon on the Mount), social factors in legal development (e.g., shame and guilt), and aspects of criminal, family, and private law (e.g., eye for an eye, incest rules, and unjust enrichment).

LAW 711 The Common Law and African Legal Systems
Spring. 3 credits. M. Ndulo.
This seminar studies legal systems in post-colonial Africa. It concentrates on the former British colonies. During the colonial period, the common law was imported into British Africa. As a result, these countries are now common law jurisdictions. The description is supported by the history of the countries as well as by current statutory guidelines. African countries, however, also retained African customary law as part of the legal system. In today's Africa, the two systems continue to operate side by side. This seminar considers the following issues: the introduction of the common law in Africa; the nature of the customary judicial process; the nature of the plural system; areas of conflict between customary law and the common law in such areas as succession, land tenure, marriage laws, and gender. It also examines issues relating to constitutional law and governance.

LAW 712 Constitutional Law and Political Theory
Spring. 3 credits. S. H. Shiffrin.
The purpose of the seminar is to explore theories of freedom of speech and theories of equality. How are the ideas of freedom, equality, association, and community linked in doctrine, and how should they be linked? Neoconservative, liberal, radical, feminist, and Marxist writings are considered.

LAW 713 Consumerism
Spring. 3 credits. D. A. Kysar.
This seminar examines evidence for the existence of consumerism as a pervasive social phenomenon, weighs arguments for and against consumerism as a welfare-enhancing or welfare-decreasing social phenomenon, unravels the role of current law in supporting or suppressing consumerism, and speculates on possible alternative legal approaches to regulating the sources and impacts of consumerism. This is accomplished through careful, contextual examination of consumerism in various legal settings. We discuss products liability law, deceptive advertising regulation, food and drug law,

anti-discrimination law, labor law, environmental law, international trade regulation, and constitutional law. Background readings on economic, psychological, critical and other theoretical approaches to consumerism will be interspersed within these units. Students complete a written research paper in conjunction with the seminar.

LAW 716 Corruption Control
Spring. 3 credits. R. C. Goldstock.
This seminar analyzes the types of corruption that exist in both the public and private sectors, the means by which a variety of criminal and non-traditional remedies may be used to reduce the frequency and impact of corrupt activities, and the constitutional and statutory problems implicated by such approaches.

LAW 720 Empirical Studies of Leading Civil Rights Issues
3 credits. T. Eisenberg.
This seminar focuses on empirical studies of sex discrimination in employment cases and death penalty cases.

[LAW European Union Law
3 credits. Not offered 2001–2002.
The course studies the EU and EU treaty, institutions, and lawmaking processes; the direct effect, supremacy, and reception of EU law in the member states, the development of the four freedoms (goods, services, persons, and capital) fundamental rights doctrine, protection of the environment, and the EU antitrust law.]

LAW 722 Ethical Issues in Criminal Practice
Fall. 3 credits. Satisfies the professional responsibility requirement.
C. Grumbach.
Using simulated problems and a real-life perspective, this seminar explores the ethical duties of and practical quandaries faced by prosecutors and defense attorneys. It examines conflicts of interest; ethical duties that pertain to the examination of witnesses and argument to the jury; the duty of the prosecutor to "seek justice," not merely to convict; the relationship of the prosecutor to witnesses and police, and the obligation to disclose exculpatory evidence; the duties and dilemmas of the defense attorney confronted with a guilty client who intends to commit perjury or an innocent client who wishes to accept a plea offer; and the right to effective assistance of counsel.

LAW 731 Immigration and Refugee Law
Fall. 3 credits. Prerequisite: Constitutional Law. S. W. Yale-Loehr.
This seminar explores the evolving relationship between U.S. immigration policy and our national purposes. Immigration plays a central role in contemporary American life, significantly affecting our foreign relations, human rights posture, ethnic group relations, labor market conditions, welfare programs, public services, and domestic politics. It also raises in acute form some of the most basic problems that our legal system must address, including the rights of insular minorities, the concepts of nationhood and sovereignty, fair treatment of competing claimants for scarce resources, the imperatives of mass administrative justice, and pervasive discrimination. In approaching these questions, the course draws on diverse historical, judicial, administrative, and policy materials.

LAW 733 International Criminal Law
Spring. 3 credits. Recommended prerequisite: Public International Law or International Human Rights. D. Wippman.
This seminar examines the evolution of modern international criminal law, from Nuremberg to the new International Criminal Court. Topics include the nature and sources of international criminal law, jurisdiction, individual and state responsibility, penalties and deterrence, and alternatives to criminal trials, such as truth commissions and amnesties. The seminar emphasizes recent developments, such as the Pinochet extradition proceedings and efforts to try senior Khmer Rouge leaders.

LAW 734 Introduction to French Law
Spring. 3 credits. Not available to students with significant knowledge of civil law system. C. M. Germain.
Introduction to the French legal system from a comparative law perspective, with a focus on civil law methodology and French legal institutions. Topics studied include French law sources and authorities, such as legislation, court decisions, and scholarly writings; the relationship between French law and the European Union; the French court structure in civil, criminal, and administrative law matters and its major procedural features; and the organization of the legal profession.

LAW 735 Islamic Law and Middle Eastern Legal Institutions
Spring. 3 credits. S. O. Hassan.
This seminar deals with the origins and sources of Islamic law, the various schools of jurisprudence, and the elaboration of an Islamic legal theory. It considers the practical application of that theory in the law of the family, the Islamic law of nations, and Islamic constitutional theory. The seminar further considers the movement of reform and secularization in Muslim countries and the role of Islamic law in the contemporary legal systems of the Middle East with particular emphasis on the law of obligations and contracts.

LAW 736 Juvenile Advocacy
Spring. 3 credits. C. Grumbach.
In the context of the simulated law office of Myron Taylor Juvenile Rights and Defenders Inc. (JRAD), students represent juveniles charged as juvenile delinquents or persons in need of supervision. Class meetings are run as weekly law office training sessions with the students functioning as junior attorneys. Students give oral presentations to their JRAD colleagues on issues of interest to them that arise from the clients' cases. Such issues may include: the preventive detention of juveniles, the application of criminal rights and defenses to delinquency proceedings, police questioning of suspected runaways, the role of the law guardian in representing juveniles, and the rights of children charged with incorrigibility to assert constitutional rights such as freedom of association and the free exercise of religion, over their parents' objection. Using simulated case files for the JRAD clients, students choose clients to represent and file various trial motions and legal memoranda before a designated judge. In this manner, students hone their persuasive writing skills and practice writing for a specific audience, learn to evaluate pleadings, and learn how to develop litigation theories and strategies and formulate a litigation plan.

[LAW Labor Law Theory and Policy Seminar (also ILR 608)
3 credits. Prerequisite: Labor Law. Not offered 2001–2002.
The U.S. collective bargaining system, which had its origins during the New Deal period, has come under intense attack. The intellectual premises of the system have been challenged by scholars on both the right and the left, and at the same time, the decline in the labor movement has undermined its political support. This seminar looks at the theoretical attacks on the New Deal collective bargaining system and at some of the current proposals for its replacement. Some of the topics discussed include: the theory of regulation embodied in the National Labor Relations Act and its critique; alternative conceptions of labor markets and their policy ramifications; and the emerging global economy and its ramifications for domestic labor regulation. There is also discussion of alternative systems of labor regulation, such as found in West Germany, Sweden, and Japan.]

LAW 740 Law and Economics
Spring. 3 credits. No prior acquaintance with economics is assumed.
S. J. Schwab.
The seminar examines the ways in which the law has incorporated, wittingly or unwittingly, an economic perspective. A major theme is the art of economic modeling and the merits and demerits of simplifying assumptions to understand law. A second theme is the Coase Theorem and its application to legal rules. The seminar focuses on the major common law rules in contracts, torts, property, and procedure. The issues surrounding fairness versus efficiency are also stressed.

LAW 741 Law and Higher Education
Spring. 3 credits. Prerequisite: Constitutional Law or Administrative Law.
J. J. Mingle.
Higher education is a complex, idiosyncratic institution. Universities and colleges have a unique mission—teaching, research, and public service—and a uniquely challenging task of accommodating the various constituencies and organizations both internal (governing boards, faculty, students) and external (alumni, legislatures, courts, government agencies), that influence how they are managed and how policies are shaped. This seminar explores the dynamic tensions, high expectations, and complex legal policy issues universities face in fulfilling their mission.

LAW 742 Law and Mental Health Seminar
Fall. 3 credits. H. R. Beresford.
The seminar explores issues at the interface of law and psychiatry. After an introduction to clinical and scientific aspects of mental illness, the seminar addresses issues of autonomy, liberty, competency, coercion, and criminal responsibility as they relate to persons with disorders of behavior, cognition, or mood. Students write and present seminar papers on self-selected topics.

LAW 743 Law and Practice in Civil Rights Litigation
Spring. 3 credits. J. Margulies.
The seminar explores the legal and practical aspects of police misconduct and prisoner civil rights litigation under 42 U.S.C. section 1983, the principal vehicle for the vindication of constitutional rights. Case materials are based on actual litigation. Each week, students 'litigate' a new issue in the case—e.g.,

municipal and supervisory liability; qualified, sovereign, and absolute immunity; punitive damages, etc.

[LAW Law, Science, and Technology
3 credits. Not offered 2001–2002.
An examination of the interaction between legal principles and procedures and scientific research and development. Topics include the role of the law in regulating cloning, recombinant DNA research, surrogacy, and in vitro fertilization; plant breeders' rights and the patentability of organic matter; judicial assessment of expert scientific evidence; and compensation for damage caused by scientific experiments and new technologies.]

LAW 745 Law through Literature
Fall. 3 credits. N. L. Cook.
In this seminar, students use literature, supplemented by law texts, as a basis for understanding operations of law and the impact of legal process on people's lives. An explicit goal of the course is the acquisition of literary skills that can be cross-utilized in law practice. Students thus not only analyze legal principles in the context of stories, but also learn how to apply such literary concepts as metaphor, imagery, plot and character development, perspective, and point of view in their legal work.

LAW 748 A Lawyer's Responsibilities—Legal Ethics and Professionalism
Fall. 3 credits. Satisfies the professional responsibility requirement. J. W. Martin.
The seminar focuses initially on the law governing lawyers' conduct and related enforcement mechanisms. The ABA's Model Rules of Professional Conduct, selected state codes, the ABA's Ethics 2000 Commission Report and the ALI Restatement of the Law Governing Lawyers are reviewed. State disciplinary processes, disqualification, and malpractice liability are considered. The focus then turns to the elements of professionalism and the extent to which they can be realized in contemporary practice. Finally, students present papers dealing with selective ethical questions or aspects of professionalism. Sample topics may include the responsibility to do pro bono work, equal justice for the poor, discovery abuse, questionable fee arrangements, fraudulent litigation practices, multi-disciplinary practice, client protection funds, and issues involving class actions.

LAW 756 Legal Aspects of Commercial Real Estate Development
Spring. 3 credits. J. E. Blyth.
Through the use of several written memoranda and one oral presentation, this seminar addresses considerations basic to commercial real estate development. It focuses on purchase agreements, options, rights of refusal, memoranda thereof, representations, and warranties; disclosure required of brokers and sellers, attorneys as brokers, notarial misconduct; conveyancing and surveys; commercial leases; conventional financing; conflicts between commercial tenants and institutional lenders; alternatives to conventional financing; title insurance; attorney opinion letters; and choice of real estate entity. About one-half of the course is devoted to commercial leases; conventional financing, and alternative to conventional financing (such as tax exempt financing and synthetic leases).

LAW 757 Legal Ethics and Legal Malpractice
Fall. 3 credits. Satisfies the professional responsibility requirement.
R. E. O'Malley.
This seminar is an in-depth examination of several fundamental legal ethics subjects: conflicts of interest, the lawyer's obligation of confidentiality, and the ethical limitations on the lawyer and the lawyer's client in a litigation matter. It is supplemented by an analysis of real cases in which a lawyer who has deviated from the norms has been found liable for legal malpractice. The seminar also explores the legal ethics obligations of junior lawyers in instances where the conduct or proposed conduct of a senior supervising lawyer is questionable. Consideration is given to relevant portions of The American Law Institute's Restatement of the Law Governing Lawyers (published in 2000), and the American Bar Association Ethics 2000 Commission's final proposals for amendments to the ABA Model Rules of Professional Conduct.

LAW 758 Litigation Skills and the Protection of Civil Rights in Housing
Fall. 3 credits. M. B. Grant.
Students perform practical, pre-trial litigation skills while exploring federal fair housing laws, history, and policies. The seminar includes litigation exercises, legal writing, reading materials, and class discussion. The litigation exercises and legal writing emphasize those skills necessary to investigate, evaluate, manage and resolve a case up to the point of trial. The seminar introduces civil rights in housing through statutes, cases, and literature about underlying policies. The course highlights the differences between some state and local fair housing laws and the federal fair housing laws, and looks at some cutting-edge litigation currently being conducted around the country. Students complete two to three page litigation exercises that simulate work assignments common in a civil litigation practice and at least one oral litigation exercise. Students are permitted to complete these exercises individually, but are encouraged to work as part of a small group. Students will draft two briefs on issues at different procedural postures (for example, injunction and summary judgment), approximately twelve pages each. Each class starts with a discussion of a new litigation skill. The class discussion then shifts to fair housing law and policy. We use photocopied materials and *American Apartheid* by Massey and Denton. The majority of a student's grade is based on the two writing assignments. The balance of the grade is based on completion of the litigation exercises and class participation.

LAW 759 Modern Legal Thought
Spring. 3 credits. S. P. Garvey.
This seminar is intended as a general introduction to modern legal theory. It begins with an examination of several different schools of legal thought (positivism, natural law, legal realism, and critical legal studies), focusing on the differing and often competing answers those schools give to a series of questions that have defined the traditional domain of jurisprudence. It next examines several different schools of political thought (libertarianism, liberalism, communitarianism, feminism, and critical race theory), together with their principal claims and commitments. It also examines how, if at all, the idea of each of these schools is reflected in the law, or alternatively, how those ideas might be used and relied upon to reshape the law. The seminar is intended for those students interested in a broad and even-handed overview and analysis of the most prominent contemporary schools of legal and political thought. Abstract ideas and arguments are, whenever possible, examined in the context of particular cases and controversies, real or imagined.

LAW 760 Organized Crime Control
Fall. 3 credits. R. C. Goldstock.
This seminar explores the challenges organized crime poses to society and to traditional law enforcement techniques. Students undertake a simulated investigation using physical and electronic surveillance, the analysis of documentary evidence, and the examination of recalcitrant witnesses before the grand jury. The RICO statute is explored in detail as are a variety of non-criminal remedies including forfeiture and court-imposed trusteeships.

LAW 765 Pretrial Practice, Litigation Strategies, and Remedies in Commercial Litigation
Spring. 3 credits. Y. G. Harmon.
This seminar studies the strategies of complex commercial litigation, focusing on case development in the pretrial period. It addresses pretrial discovery (strategies and approaches), and remedies (e.g., preliminary injunctions, receiverships) in the context of difficult and unclear legal issues . Damages theories and development are also explored, as is the use of litigation to achieve business goals. Hardball litigation techniques as well as ethical considerations are considered. Actual litigated cases are dissected.

LAW 766 Problems in Advanced Torts
Spring. 3 credits. J. A. Henderson, Jr.
Students have an opportunity to write a paper on a topic of their choosing from the law of torts. Topics not typically covered in the first-year torts course are preferable, including (but not limited to) products liability, business torts, environmental torts, and defamation. Papers are similar in length and scope to a student note in a law review. Required written submissions include topic proposals, outlines, bibliographies, first drafts, and final drafts. Early meetings are devoted to discussions of background topics—e.g., economic analysis of tort law, fairness-based theories, and the like—and selection of topics. Later meetings give each student an opportunity to present his/her work product to the group.

[LAW Reproductive Issues Seminar
3 credits. Not offered 2001–2002.
This seminar considers various reproductive dilemmas, paradoxes, and policies in modern American society. Birth control and abortion are addressed, but the emphasis is on placing the reproductive process within a broad sociolegal context. To this end, we explore issues such as eugenics, the use and regulation of medical technology, lesbian mothering, the relationship between reproduction and poverty programs, and a variety of other contemporary issues.]

LAW 772 Selected Business Transactions Seminar
Fall. 3 credits. Recommended prerequisites: Corporations. Z. J. Shulman.
An in-depth look at initial public offerings and acquisitions from a practitioner's point of view. With respect to initial public offerings,

the course covers: the applicable statutory framework, pre-offering corporate preparations (such as the implementation of poison pills and stock option plans), the due diligence process, the implementation of corporate governance policies appropriate for a public company, the offering registration process, liability under federal securities laws, the Securities and Exchange Commission review process, underwriting arrangements, selection of a trading forum (i.e., NYSE, NASDAQ, or AMEX) and the transaction closing. Regarding mergers and acquisitions, the course explores: financing alternatives, accounting treatment, due diligence, choosing an appropriate transaction structure (i.e., stock versus asset sale), public company transaction issues i.e., antitakeover matters and fiduciary concerns, fiduciary duties, and crucial legal aspects of the acquisition, such as letters of intent, successor liability, continuity of employees, and noncompetition agreements.

LAW 774 Separation of Powers
Fall. 3 credits. Prerequisite: Constitutional Law and Administrative Law strongly advised. Students without such background should consult instructor.
C. R. Farina.
The last 20 years have witnessed more debate about the nature and consequences of "separation of powers" than we have seen since the Founding Era. This seminar examines the ways this concept is understood and used by modern judges, legislators, executive officials, and scholars to justify, or to attempt to modify, the distribution of power within contemporary American government.

LAW 776 Street Law
Fall. 3 credits. W. F. Taylor.
As a new offering in the fall semester, this seminar allows law students to lead weekly discussions at the Auburn Correctional Facility on contemporary legal topics. Although all students enrolled in the seminar are expected to attend the weekly meeting, two students are responsible for presenting a legal or policy issue at each meeting and then opening the floor to questions and comments from the prisoners in attendance. Prison administrators determine who will attend the legal seminar series. From the experience of those in other disciplines who have done similar prison projects at Auburn, it is anticipated that not more than thirty prisoners will participate weekly. The objective of this seminar is to facilitate the exchange of ideas and to give students an additional opportunity to take law and legal education beyond the traditional classroom setting. Possible topics might include: Reparations for African Americans: Legal and Policy Issues; Racial Profiling; Family Law and the Rights of Fathers; Term Limits on Elected Officials: Pornography as Discrimination Against Women; The Relevance of Race, Ethnicity, and Sex to Judicial Appointments; Therapeutic Jurisprudence and Shaming Penalties; and Fourth Amendment and Other Limits on Policing Schools for Drugs and Guns.

LAW 777 Theories of Law, Theories of Film
Spring. 3 credits. C. D. Bond.
This seminar examines cultural representations of the American legal system and lawyers. As part of the course materials, students view several canonical, mostly American, films that deal with the law. Students learn the language of film form and theory, which they use to discuss how particular films construct narratives about the legal system. Topics of inquiry include parallels between law and film as narrative systems, the role of interpretation in constituting legal and cultural meaning, and the manner in which cultural representations of law reflect cultural values, fantasies, and myths, with particular attention given to narratives of race and gender. Students read film theory and criticism and legal theory in an attempt to correlate theories of narrative across both disciplines.

LAW 778 Theories of Property
Fall. 3 credits. Prerequisite: Property.
G. S. Alexander.
This seminar explores the various ways that people have conceived of, or understood, property. The materials studied are eclectic and interdisciplinary. They include readings on commonses, commodification, and women and property, as well as the classical justifications for private property (libertarian, utilitarian, etc).

LAW 779 Topics in Feminist Legal Theory
Spring. 3 credits. M. A. Fineman.
Over the course of the semester we examine the work of 5 or 6 feminist legal theorists who will also be guest lecturers in the class. The feminist scholars chosen are experts on a variety of legal topics including sexuality, reproduction, family, and work. The objective is to introduce students to feminist thinking and critique in these specific areas, as well as generally. In addition, the seminar is designed to give students an understanding of the processes whereby scholarly (and policy) ideas and concepts are developed by an individual through much revision, reflection and struggle. Two or three pieces of writings by each scholar are distributed and discussed in the session preceding her/his visit to the class. The following week the scholar speaks to the students about the readings and her/his experiences. The scholar responds to questions and comments about her/his current thinking and the direction of future work in her/his area(s) of expertise. Questions and comments are generated and distributed in advance of the scholar's appearance in the class by the students in the form of "reflection papers." A research paper on one of the topics discussed is required at the end of the semester.

LAW 780 Trial Preparation and Practice
Fall. 3 credits. H. C. Hay.
Using a sexual harassment lawsuit as a focal point, this seminar seeks to provide students with understanding of, and training in, the basic skills of trial preparation and practice. Students draft a complaint and answer, take and defend a deposition, prepare for and attend a mediation, and ultimately present the case to a mock jury.

CLINICAL COURSES AND EXTERNSHIPS

All clinic courses and externships have limited enrollment.

LAW 781 Capital Punishment Clinic: Post-Conviction Litigation
Spring. 4 credits. Prerequisite: permission of instructor; Criminal Procedure or criminal law experience preferred.
J. H. Blume, S. L. Johnson.
Clinic covers death penalty post-conviction litigation including: investigation and the preparation of petitions, memorandums, and briefs. This course is taught as a clinic. Two or possibly three South Carolina Death Row cases are worked on by students. Case selection depends on both pedagogical factors and litigation needs of the inmates. Students read the record and research legal issues. Some students are involved in investigation, while others assist in the preparation of papers. All students are included in discussions regarding the necessary investigation and strategy for the cases.

LAW 782 Capital Trial Clinic
Spring. 4 credits. Prerequisite: permission of instructor; Criminal Procedure or criminal law experience preferred.
J. H. Blume, S. L. Johnson.
The clinic covers the issues that are unique to a capital trial, with a focus on a specific capital trial and the issues it presents.

LAW 783 Full-Term Externship
Fall. 12 credits. G. G. Galbreath, J. M. Miner.
Occasionally students find that their educational and career goals would be best achieved by spending one semester working at a placement outside the law school. The Full-Term Externship course allows students to earn 12 credit hours as externs working full time at various approved placement sites during the fall semester of their third year. Written application must be submitted to the instructors by March 1 of the preceding spring semester. The application should include, among other things, a description of the placement and the activities that the extern expects to perform, a statement of the extern's educational and career goals, and an explanation of how those goals are better met at the placement than at the law school. The instructors, in collaboration with the Associate Dean for Academic Affairs, review the applications and, by March 15, decide whether each applicant should be granted conditional approval. For students to receive final approval, the placement site must accept the student for the placement and meet specified criteria including identification of an attorney at the placement who will closely supervise and mentor the extern. In addition to his or her work responsibilities for the placement, the extern prepares weekly journal entries for the instructor serving as his or her faculty supervisor, provides the instructor with samples of his or her written work product, engages in regular e-mail communication with the instructor (and, if required by the instructor, with other students in the course), hosts the instructor for a site visit, makes a written evaluation of the placement and the placement experience for the law school's files, and makes him- or herself available in the semester following the externship to do a presentation about the placement for the law school community.

LAW 784 Government Benefits Clinic
Spring. 6 credits. Course has two classroom components: Government Benefits Clinic class and Clinical Skills 1 or Clinical Skills 3. B. Strom.
The course has a substantive component, in which a broad conceptual understanding of a complex and controversial area of law and public policy is developed, and a live client clinical experience, in which those concepts can be applied in solving actual client

problems. The substantive component provides an introduction to government benefits law by examining various social insurance and need-based benefit programs including Social Security, Unemployment Insurance, Temporary Assistance to Needy Families (TANF), Supplemental Security Income (SSI), Medicaid, and Food Stamps. Case handling involves the representation of clients in government benefits cases involving the Tompkins County Department of Social Services, the N.Y.S. Department of Labor and the Social Security Administration. The course also includes Clinical Skills 1 or Clinical Skills 3. Clinical Skills 1 class addresses interviewing, counseling, negotiation, and advocacy skills through the use of readings, videotapes, discussions, demonstrations, and simulation exercises. Clinical Skills 3 builds on the skills taught in Clinical Skills 1 and addresses such topics as alternative dispute resolution, formal discovery, and motion argument.

LAW 785 Government Benefits Clinic/ Neighborhood Legal Services Externship

Spring. 6 credits. B. Strom.

This course is a combination of Government Benefits and the Neighborhood Legal Services Externship and either Clinical Skills 1 or Clinical Skills 3. The course is the same as Government Benefits except that the case handling component involves handling cases for the Ithaca office of Neighborhood Legal Services. See the descriptions for the Government Benefits Clinic and the Neighborhood Legal Services Externship for additional details.

LAW 786 Judicial Externship

Fall or spring. 4 credits. G. G. Galbreath.

Students work with a trial court judge. Work involves courtroom observation, conferences with the judge, research and writing memoranda, and drafting decisions. The emphasis is on learning about judges, the judicial decision-making process, and trials. There are weekly class meetings with readings and discussions of topics related to the externship experience. While the primary focus is the student's work at the placement, each student also does a class presentation, a final project, and meets individually with the faculty member.

LAW 790 Law Guardian Externship

Fall or spring. 4 credits. J. M. Miner.

Students learn about the representation of children in abuse and neglect cases, juvenile delinquency proceedings, and PINS (Person in Need of Supervision) cases through their placement at the Tompkins County Law Guardian office. Duties may include interviewing, investigation, drafting memoranda and motions, and assisting in trial preparation. The classroom component is provided by Clinical Skills 1, 2 (fall), or 3 (spring), depending on whether the student has previously been enrolled in a course in which Clinical Skills 1 was a component. Clinical Skills 1 class addresses interviewing, counseling, negotiation, and advocacy skills through the use of readings, videotapes, discussions, demonstrations, and simulation exercises. Clinical Skills 2 builds on the skills taught in Clinical Skills 1. Clinical Skills 3 builds on the skills taught in Clinical Skills 1 and 2.

LAW 791 Legislative Externship

Fall or spring. 3 credits. B. Strom.

Students work with the local New York State Member of Assembly. Work involves drafting legislation, tracking legislation for constituents, legal research and writing, responding to constituent requests that particularly require legal research or an explanation of law. The emphasis is on learning about legislative process, drafting of legislation, understanding the reasons for statutory ambiguity, and developing various skills. There are several informal meetings with the faculty supervisor during the semester with readings and group discussions related to the externship experience.

LAW 792 Neighborhood Legal Services Externship

Fall or spring. 4 credits. B. Strom.

Classroom component is provided by Clinical Skills 1, 2 (fall), or 3 (spring), depending on whether the student has previously been enrolled in a course in which Clinical Skills 1 was a component. Cases involve the representation of clients of a legal services office, the Ithaca office of Neighborhood Legal Services (NLS). Along with case handling, this externship includes a classroom component, provided by Clinical Skills 1, 2, or 3. The classes are devoted to the development of lawyering skills and issues related to professional responsibility and the role of an attorney. In addition, each student meets periodically with the faculty supervisor for review of the placement experience.

LAW 793 Public Interest Clinic 1

Fall or spring. 4 credits. Note: During the second or third week their may be an additional class session. Classes are mandatory. N. Cook, G. G. Galbreath, J. M. Miner, R. Seibel, B. Strom.

Students handle civil cases for low-income clients of the Public Interest Clinic under the supervision of the clinic faculty. Students interview and counsel; investigate and analyze facts; interrelate substantive and procedural law with facts in the context of actual representation; develop a strategy to handle clients' problems; identify and resolve professional responsibility issues; do legal writing; negotiate and settle cases; and represent clients at administrative hearings. Classroom component is provided by the Clinical Skills 1 class, in which students develop interviewing, counseling, negotiation, and advocacy skills through the use of readings, videotapes, discussions, demonstrations, and simulation exercises.

LAW 794 Public Interest Clinic 2

Fall. 4 credits. Prerequisite: Public Interest Clinic 1 or a clinic course that included the Clinical Skills 1 classroom component. N. Cook, G. G. Galbreath, J. M. Miner, R. Seibel, B. Strom.

Students handle Public Interest Clinic cases, participate in a classroom component, Clinical Skills 2, and help supervise participants in Public Interest Clinic 1. Cases are handled as described in the course description for Public Interest Clinic 1. The classroom component, Clinical Skills 2, builds on the skills taught in Clinical Skills 1. Students represent the clinic's clients in both federal and state courts.

LAW 795 Public Interest Clinic 3

Spring. 4 credits. Prerequisite: Public Interest Clinic 1 or a clinic course that included the Clinical Skills 1 classroom component. N. Cook, G. G. Galbreath, J. M. Miner, R. Seibel, B. Strom.

Students handle Public Interest Clinic cases, participate in a classroom component, Clinical Skills 3, and help supervise participants in Public Interest Clinic 1. Cases are handled as described in the course description for Public Interest Clinic 1. The classroom component, Clinical Skills 3, builds on the skills taught in Clinical Skills 1 and 2. Students represent the clinic's clients in both federal and state courts.

LAW 797 Women and the Law Clinic

Spring. 6 credits. J. M. Miner.

The course has two classroom components: Women and the Law Clinic class and Clinical Skills 1 or Clinical Skills 3 class. Students represent women clients who have legal matters primarily in the family law area (divorce, custody, support, domestic violence). The Women and the Law Clinic class focuses on such issues as the impact of substantive law on women, the impact of legal institutions on women, professional role development, feminist lawyering methods, and other topics related to women and the law. Students also participate in the lawyering skills classroom component, Clinical Skills 1 or Clinical Skills 3. Clinical Skills 1 addresses interviewing, counseling, negotiation, and advocacy skills through the use of readings, videotapes, discussions, demonstrations, and simulation exercises. Clinical Skills 3 builds on the skills taught in Clinical Skills 1.

LAW 798 Youth Law Clinic

Spring. 6 credits. Course has two classroom components: Youth Law Clinic class and Clinical Skills 1, 2 (fall), or 3 (spring) class. N. Cook.

Students work with groups of youth and service providers in a multifaceted approach to identifying and resolving problems of a legal nature. Under the supervision of faculty and community experts, clinic students both handle individual representation cases and participate in non-litigation project work such as community education, legislative advocacy, and mediation training. The emphasis of the course is on planning, communication, policy development, and nonadversarial problem solving. Students also participate in the lawyering skills classroom component, Clinical Skills 1, 2, or 3. Clinical Skills 1 class addresses interviewing, counseling, negotiation, and advocacy skills through the use of readings, videotapes, discussions, demonstrations, and simulation exercises. Clinical Skills 2 builds on the skills taught in Clinical Skills 1.

NONPROFESSIONAL COURSES

GOVT 313 The Nature, Functions, and Limits of Law

Spring. 4 credits. Undergraduates only. R. A. Hillman.

A general-education course for students at the sophomore and higher levels. Law is presented not as a body of rules but as a set of techniques for resolving conflicts and dealing with social problems. The course analyzes the roles of courts, legislatures, and administrative agencies in the legal process, considering also constitutional limits on their power and practical limits on their effectiveness. Assigned readings consist mainly of judicial and administrative decisions, statutes and rules, and commentaries on the legal process.

LAW 406 Biotechnology and Law (also B&SOC 406)

Spring. 4 credits. Undergraduates only. L. I. Palmer.

Biotechnology, with myriad applications in areas such as medicine and agriculture, is

creating many challenges for basic social institutions. This course explores the use and potential abuse of biotechnology in areas such as genetic screening and counseling, reproductive technologies, intentional release of genetically engineered organisms, patents, and ownership of human tissue. Particular attention is given to evolving legal and management strategies for regulating the applications of biotechnology. Readings are from science, medicine, law, and public policy. Several short written assignments as well as a research paper are required.

LAW 410 Limits on and Protection of Creative Expression—Copyright Law and Its Close Neighbors
Fall. 4 credits. P. W. Martin.
This course, offered during fall term 2001, provides an introduction to copyright law and closely related legal regimes for non-law students. The bulk of the instruction and discussion are on-line.

Copyright law has become increasingly important as the U.S. has shifted from a predominantly manufacturing economy to an information economy, with such products as software, recorded music, movies, and TV assuming major importance as exports, and digital distribution exploding. This course provides an overview of U.S. copyright law and the relationship between copyright and contractual license, trademark, patent, and the "right of publicity" as these other regimes relate to information products. The survey begins with the substantive and procedural requirements that surround copyright protection. It proceeds to survey the rights granted copyright holders and important limits on those rights such as "fair use." How infringement is established, what remedies are available, and other important features of copyright litigation are covered. Issues raised by new information technologies and recent amendments addressing them receive special attention. Finally, because of the growing importance of the global market for copyright-protected products, the international copyright system is also addressed.

FACULTY ROSTER

Abrams, Kathryn A., J.D., Yale U. Prof. of Law and Assoc. Prof. of Ethics and Public Life in the College of Arts and Sciences
Alexander, Gregory S., J.D., Northwestern U. A. Robert Noll Prof.
Atkinson, Robert E., Jr. J.D., Yale U. Visiting Prof.
Barcelò, John J. III, S.J.D.., Harvard U. William Nelson Cromwell Professor of International and Comparative Law
Blume, John H., J.D., Yale U. Visiting Prof.
Clermont, Kevin M., J.D., Harvard U. James and Mark Flanagan Professor of Law
Clymer, Steven D., J.D., Cornell U. Assoc. Prof.
Cripps, Yvonne M., Ph.D., U. of Cambridge. Visiting Prof.
Eisenberg, Theodore, J.D. U. of Pennsylvania. Henry Allen Mark Professor of Law
Farina, Cynthia R., J.D., Boston U. Prof.
Fineman, Martha A., J.D., U. of Chicago. Doreatha S. Clarke Professor of Feminist Jurisprudence
Garvey, Stephen P., J.D., Yale U. Prof.
Germain, Claire M., M.L.L., U. of Denver. Edward Cornell Law Librarian and Professor of Law
Gifford, William C., LL.B., Harvard U. Prof.
Green, Robert A., J.D., Georgetown U. Prof.
Hay, George A., Ph.D., Northwestern U. Edward Cornell Professor of Law and Professor of Economics in the College of Arts and Sciences
Hay, Howard C., J.D., U. of Michigan. Visiting Prof.
Henderson, James A., Jr., LL.M., Harvard U. Frank B. Ingersoll Professor of Law
Hillman, Robert A., J.D., Cornell U. Edwin H. Woodruff Professor of Law
Holden-Smith, Barbara J., J.D., U. of Chicago. Prof.
Johnson, Sheri L., J.D., Yale U. Prof.
Kysar, Douglas A., J.D., Harvard U. Asst. Prof.
Macey, Jonathan R., J.D., Yale U. J. DuPratt White Professor of Law
Margulies, Joseph, J.D., Northwestern U. Visiting Prof.
Martin, John W., Jr., J.D., DePaul U. Visiting Prof.
Martin, Peter W.., LL.B., Harvard U. Jane M. G. Foster Professor of Law
Ndulo, Muna B., D. Phil., Trinity C. Prof.
Palmer, Larry I., LL.B., Yale U. Prof.
Rachlinski, Jeffrey J., Ph.D., Stanford U. Prof.
Rossi, Faust F., J.D., Cornell U. Samuel S. Leibowitz Professor of Trial Techniques
Ruskola, Teemu, J.D., Yale U. Asst. Visiting Prof.
Schwab, Stewart J., Ph.D., U. of Michigan. Prof.
Shiffrin, Steven H., J.D. Loyola U. of Los Angeles. Prof.
Siliciano, John A., J.D., Columbia U. Prof.
Simson, Gary J., J.D. Yale U. Prof.
Spence, David B., Ph.D., Duke U. Asst. Visiting Prof.
Stone, Katherine V. W., J.D., Harvard U. Prof. of Law and Anne Evans Estabrook Prof. of Dispute Resolution in the School of Industrial and Labor Relations
Summers, Robert S., LL.B., Harvard U. William G. McRoberts Research Professor in Administration of the Law
Taylor, Winnie F., LL.M., U. of Wisconsin. Prof.
Teitelbaum Lee E., LL.M., Northwestern U. Prof.
Wippman, David, J.D., Yale U. Prof.

Legal Aid Clinic

Cook, Nancy L., J.D., Georgetown U. Senior Lecturer and Director
Galbreath, Glenn G., J.D., Case Western Reserve U. Senior Lecturer
Miner, JoAnne M., J.D., U. of Connecticut. Senior Lecturer
Seibel, Robert F., J.D., Northwestern U. Visiting Sr. Lecturer
Strom, Barry, J.D., Cornell U. Senior Lecturer, Cornell Legal Aid Clinic

Legal Methods Program

Anderson, Paige S., J.D. Cornell U. Lecturer
Atlas, Joel, J.D., Boston U. Senior Lecturer
Bond, Cynthia D., J.D., Cornell U. Lecturer
Grumbach, Carol, J.D., Cornell U. Director of Legal Methods Prog. and Senior Lecturer
McKee, Estelle M., J.D., Columbia U. Lecturer
Mooney, Andrea J., J.D., Cornell U. Lecturer

Academic Library Staff

Germain, Claire M., LL.B., U. of Paris. Edward Cornell Law Librarian and Professor of Law
Bynum, Charlotte L., J.D., Tulane U. Reference Librarian
Court, Patrica G., J.D. Hamline U. Asst. Director for Administration and Public Affairs
Gillespie, Janet M., M.S., Cornell U. Adminsitrative Supervisor/Access Service
Kreisler, Brandy, J.D., Texas Tech. Reference Librarian
Pajerek, Jean M., M.L.S., SUNY-Albany. Head of cataloging

Members of Other Faculties Associated with the Law School

Carmichael, Calum M., B. Litt., Oxford U. Prof. College of Arts and Sciences
Hirschmann, Nance, J., Ph.D., Johns Hopkins U. Assoc. Prof., Government
Kuruvilla, Sarash C., Ph.D., U. of Iowa. Assoc. Prof., School of Industrial and Labor Relations
Lieberwitz, Risa L., J.D., U. of Florida. Assoc. Prof., Collective Bargaining, Labor Law, and Labor History
O'Hara, Maureen, Ph.D., Northwestern U. Prof., Johnson Graduate School of Management
Santiago-Ivizarry, Vilma, Ph.D., New York U. Asst. Prof., College of Arts and Sciences

Adjunct Faculty Members

Balotti, R. Franklin, LL.B., Cornell U. Adjunct Prof.
Beresford, H. Richard, M.D., U. of Colorado. Adjunct Prof.
Blyth, John E., Dr.jur., Goethe U. Adjunct Prof.
Briggs, W. Buckley, J.D., Georgetown U. Adjunct Prof.
Davis, Johnita, P., J.D., Cornell U. Adjunct Prof.
Davis, Jonathan G., LL.M. Georgetown U. Adjunct Prof.
Gaulding, Jill R., J. D., Cornell U. Adjunct Prof.
Grable, Andrea F., J.D., Cornell U. Adjunct Prof.
Goldstock, Ronald G., J.D., Harvard U. Adjunct Prof.
Grant, Mary Elizabeth, J.D., Cornell U. Adjunct Prof.
Harmon, Yvette G., Cornell U. Adjunct Prof.
Hassan, Sherif O., LL.M., Cornell U. Adjunct Prof.
Kingston, Andrew, J.D., Harvard U. Adjunct Prof.
Meyer, Judith P., J.D., Cornell U. Adjunct Prof.
Mingle, James J., J.D., U. of Virginia. Adjunct Prof.
O'Malley, Robert E., J.D., Northwestern U. Adjunct Prof.
Ridgeway, Delissa A., J.D., Northeastern U. Adjunct Prof.
Shulman, Zachary, J.D., Cornell U. Adjunct Prof.
St. Landau, Norm D., J.D., Antioch C. Adjunct Prof.
Silverstein, Karen, J.D., Cornell U. Adjunct Prof.
White, Dale T., J.D., Cornell U. Adjunct Prof.
Yale-Loehr, Stephen W., J.D., Cornell U. Adjunct Prof.

DIVISION OF NUTRITIONAL SCIENCES

ADMINISTRATION

Jere Haas, director

Carole Bisogni, associate director for academic affairs

Michael Kazarinoff, director of graduate studies, Field of Nutrition

THE DIVISION

Nutritional Science draws upon the chemical, biological, and social sciences to understand the complex relationships between human health, nutritional status, food and lifestyle patterns, and social and institutional environments. Understanding these relationships includes the study of the metabolic regulation and function of nutrients, nutrient requirements throughout the life span, the role of diet in reducing risk of chronic disease, the nutritional quality of foods, and interventions and policies designed to promote the nutritional health of individuals, communities, and populations.

The focus of this broad field of study at Cornell is the Division of Nutritional Sciences, which brings together specialists from many disciplines. The faculty are involved in undergraduate and graduate teaching, research, and extension of research-based knowledge throughout New York State, the nation, and the world.

The division is affiliated with both the College of Human Ecology and the College of Agriculture and Life Sciences. The undergraduate program in Nutritional Sciences is offered through the College of Human Ecology. An undergraduate program, Nutrition, Food, and Agriculture, is offered in the College of Agriculture and Life Sciences. The undergraduate program in Human Biology, Health, and Society is offered through the College of Human Ecology. A program of study in nutrition for biological science majors is offered in collaboration with the undergraduate program in biology. Graduate study in the field of nutrition, is administered by faculty members throughout the university.

FACILITIES

Most of the faculty members of the division work in Savage Hall, Kinzelberg Hall, and Martha Van Rensselaer Hall. In addition to housing offices, classrooms, and seminar rooms, these buildings contain research facilities, specialized laboratories, a human metabolic research unit, and computer facilities. The division's Learning Resource Center in Martha Van Rensselaer Hall is used by students for individual study and for small group discussions. The Learning Resource Center contains computers and printed and audiovisual resources which give students access to specialized software. Savage Hall also has a graduate reading room.

UNDERGRADUATE PROGRAMS

The Division of Nutritional Sciences offers three programs leading to a B.S. degree:

Nutritional Sciences (NS), College of Human Ecology: this program provides students with a strong foundation in the broad field of nutritional sciences as well as thorough training in chemistry and biology. Students may prepare for a variety of career interests including medicine and other health careers, fitness and sports nutrition, nutrition counseling, clinical nutrition, dietetics, nutritional biochemistry, community nutrition, and nutrition education.

Nutrition, Food, and Agriculture (NFA), College of Agriculture and Life Sciences: this program is for students who want strong training in human nutrition combined with supportive course work in the agriculture and the life sciences. Strong preparation in biology, chemistry, and math is required. Students in the Nutrition, Food, and Agriculture program supplement the nutrition curriculum with courses in areas such as food science, animal science, plant science, advanced biology, business and economics, education, and communication.

Human Biology, Health, and Society (HBHS), College of Human Ecology: established in 1997, this program gives students a strong foundation in biology. It then goes on to explore human health issues from the perspectives of both biology and the social sciences. Students complete a rigorous curriculum in the natural sciences and then, choosing from a wide array of courses offered in the College of Human Ecology, focus their studies on health issues of their choice. Students can explore such topics as gene expression and metabolism related to disease states, biological and social aspects of growth and development, and policies and programs influencing health.

The Division also offers the **Program of Study in Human Nutrition for biological sciences majors** who may be enrolled in the College of Agriculture and Life Sciences or College of Arts and Sciences. The program of study in Human Nutrition offers biology majors courses on the nature and biochemical function of essential and non-essential nutrients, nutrient requirements, the role of nutrients in gene expression, and the role of diet in both risk of chronic disease and treatment of existing disease states.

Students in this program of study are encouraged to complete a diverse set of advanced courses. They afford a perspective on current knowledge of nutrient requirements and function, and how this knowledge can be put to use. With the exception of a core course in the structure and function of nutrients, the course requirements are unspecified.

Faculty advisers work with individual students to develop a curriculum that fits the students' interests. As part of their program, students are encouraged to obtain laboratory experience either through coursework or research. Students completing the program in nutrition most often choose to continue their education in medical or graduate school, and pursue careers in the applied aspects of nutrition or in laboratory-based or epidemiological research.

THE CURRICULUM

Undergraduate students in these programs complete the requirements of their colleges as well as the courses required by the program of their specific interest.

The NS, NFA, and HBHS programs all require a rigorous sequence of courses in chemistry and biology, including introductory chemistry and biology, organic chemistry, biochemistry, and physiology. A minimum competency in college algebra is required with an additional math and/or statistics requirement for some programs and career paths. Students in the HBHS major also complete a course in physics and two additional courses in advanced biology.

All students complete the introductory course, Nutrition and Health: Concepts and Controversies (NS 115). The NS and NFA programs require the completion of four other core courses: Social Science Perspectives on Food and Nutrition (NS 245); Nutritional and Physicochemical Aspects of Foods (NS 345); Physiological and Biochemical Bases of Nutrition (NS 331); and Methods in Nutritional Sciences (NS 332). Students in these programs also must select a minimum of nine credits in advanced courses in the nutritional sciences.

The HBHS major requires a minimum of six credits from courses that integrate biology and the social sciences as they examine health issues. In addition, students also must complete nine credits of advanced electives in courses focused on human biology, health, and society.

Undergraduate students in these programs have a faculty adviser with whom they meet at least twice a year. Advisers help students plan their course schedules and can suggest opportunities for individual study or experience outside the classroom.

In all undergraduate programs the correct sequencing of biology, chemistry, and/or nutrition courses is very important. Students considering these programs should get detailed information about course requirements from the division's Academic Affairs Office, 309/335 MVR. This office offers a wide range of advising materials to help students develop a program of study that matches students' interests and needs.

CAREER OPTIONS AND COURSE PLANNING

Requirements for the programs are the minimum set of courses necessary for a

bachelor's degree in these fields. Students should supplement their requirements with elective courses and other learning experiences that will prepare them for entry-level jobs or advanced study in their field(s) of interest. A summary of suggested electives for different career interests follows:

Medicine and Other Health Careers: Recommended courses for pre-med students include calculus and two terms of physics. Specific information about medical school admissions requirements can be obtained from the university's Health Careers Office, 203 Barnes Hall. Students interested in other health careers should acquire specific information about those requirements. Courses of interest may include those related to the biological and social determinants of health; human growth, development, and behavior through the life course; interpersonal communications; advanced biology; sociology; psychology; and ethics.

Dietetics: Students who wish to work in the areas of clinical nutrition, nutrition counseling, sports nutrition, community nutrition, or food and nutrition management should complete the academic requirements for The American Dietetic Association (ADA). Courses in foods, nutrition and disease, microbiology, management, statistics, and nutritional care are added to the courses required for the nutrition programs. For more information about meeting ADA requirements see Marie Kamp, 373 MVR.

Exercise, Nutrition, and Health Promotion: Students should complete a course in physiology and a course in anatomy after introductory biology. Students can complete the Applied Exercise Science Concentration at Ithaca College, which includes courses in kinesiology, exercise physiology, and biomechanics. Students who wish to apply to graduate schools to study physical therapy should complete a year of introductory physics, a course in statistics, a course in ethics, and three courses in psychology. Students should check the specific requirements of their schools of interest. For information about the Applied Exercise Science Concentration, contact the DNS Academic Affairs Office, 309 MVR.

Biomedical Research/Nutritional Biochemistry: Recommended electives include calculus, physics, genetics, advanced biology and chemistry, toxicology, and nutritional sciences courses related to the physiology, biochemistry, and metabolism of different nutrients and disease states.

Public Health and Community Nutrition: Suggested electives include courses in communications, education, human development, policy analysis and management, maternal and child nutrition, geriatric nutrition, nutrition and disease, and food economics.

Nutrition, Food, and Business: Recommended electives include courses in management, marketing, economics, communications, hotel administration, and food science.

Nutrition and Agriculture: Recommended electives include courses in food science, animal science, plant sciences, international agriculture, agricultural economics, biological sciences, and rural sociology.

International Nutrition: Recommended electives include courses in language, anthropology, agricultural economics, policy, economics, rural sociology, international agriculture, and nutritional sciences related to maternal and child health and problems of developing nations.

Biology and Behavior: Recommended electives include courses in psychology, human development, and neurobiology.

Food, Nutrition, and Health Policy: Recommended electives include courses in economics, sociology, government, policy analysis, and management.

SPECIAL EXPERIENCES

Undergraduates can enhance their experiences by participating in structured field experiences or study abroad. Academic credit can be earned for field experiences in a community agency, health-care facility, or business. The Urban Semester in the College of Human Ecology provides students with an opportunity to study and gain field experience in New York City. All students intending to spend a term off campus in field experience or study abroad must plan their courses well in advance to be sure that all program requirements can be met.

INDEPENDENT STUDY ELECTIVES

Independent study courses (NS 400, 401, 402) can be used to obtain credit for more diverse or intensive experience than the classroom can offer, whether this involves laboratory work, library research, or field study. Any student interested in independent study should obtain the sponsorship of a faculty adviser and the approval of the associate director for academic affairs or consider applying to the honors program.

HONORS PROGRAM

The honors program, leading to a B.S. degree with honors in the College of Human Ecology, or B.S. degree with Distinction in Research in the College of Agriculture and Life Sciences, gives official recognition to students who have demonstrated excellence in their academic work and their capacity for independent study.

In addition to fulfilling the requirements for a major, students in the honors program take seminars in designing and evaluating research, complete an original piece of research (at least six credits of NS 499), and prepare an honors thesis. The honors project may be laboratory or field research or deal with policy and program development. For more information, students should contact Michael Kazarinoff, 230 Savage Hall..

COURSES RECOMMENDED FOR NONMAJORS

Courses in nutritional sciences can strengthen programs of study in biological sciences, biology and society, communications, food science, human development, human services, and other fields.

NS 115, Nutrition and Health: Concepts and Controversies, is open to all students. After NS 115, nonmajors with limited backgrounds in chemistry and biology may elect NS 200, Vegetarian Nutrition: An Introduction; NS 245, Social Science Perspectives on Food and Nutrition; NS 247, Food for Contemporary Living; NS 262, Nutrients and Cells; NS 275, Human Biology and Evolution; NS 306, Nutritional Problems of Developing Nations; NS 315, Obesity and the Regulation of Body Weight; NS 347, Human Growth and Development: Biological and Behavioral Interactions; NS 380, Integrating Food Systems and Human Nutrition Needs; NS 450, Public Health Nutrition; NS 451 Epidemiology and Health of Human Communities. Nonmajors with strong backgrounds in chemistry and the biological sciences may consider NS 331, Physiological and Biochemical Bases of Human Nutrition, as well as many advanced nutritional sciences courses, such as NS 345 Physicochemical and Nutritional Aspects of Foods; NS 431 Mineral Nutriton and Chronic Disease; NS 441, Nutrition and Disease; and NS 475 Molecular Nutrition and Development.

GRADUATE PROGRAMS

Graduate study is administered by the Field of Nutrition, a group of about 40 faculty members from throughout the university who have a common interest in nutritional problems. In the M.S. and Ph.D. degree programs, students may specialize in molecular and biochemical nutrition, human or animal nutrition, community nutrition, or international nutrition. Research is emphasized in all graduate programs. Field experience may be an important component of concentrations in community, international and public-health nutrition, and nutrition education. Teaching experience and participation in the graduate student seminar (NS 703) are important aspects of graduate training.

The specialties and interests represented by faculty in the Field of Nutrition provide almost unlimited opportunity for graduate study. Cornell's extensive laboratory and agricultural facilities ensure that students interested in experimental nutrition have exceptional choices and thorough training. As the largest faculty in the country devoted to the study of human nutrition, the field includes specialists in biochemical, metabolic, epidemiological, and sociocultural research. Opportunities to work with community and federal agencies are available to students interested in applied nutrition and public policy. Students in international nutrition are expected to conduct their thesis research abroad.

For more information about the graduate program, please write for the brochure. Graduate Study in Nutrition, available from the Director of Graduate Studies, Field of Nutrition, Cornell University, 309 MVR Hall, Ithaca, NY 14853–4401; telephone (607) 255–4410; web site: www.nutrition.cornell.edu/grad.html, e-mail: nutrition_gfr@cornell.edu

COURSES

NS 115 Nutrition and Health: Concepts and Controversies
Fall. 3 credits. S-U grades optional. M W F 1:25. D. Levitsky.
The course will discuss the facts and fallacies concerning the role that nutrition, exercise,

and other health behaviors play in preventing disease, maintaining good health, and maximizing athletic performance. Emphasis is on understanding the biological mechanisms through which good nutrition and regular exercise affect psychological and physical health.

NS 116 Personalized Concepts and Controversies
Fall. 1 credit. Corequisite: NS 115. S-U only. Limited to freshmen and transfer students, 10 per section. TBA. E. West.
This course provides students enrolled in NS 115 individualized assistance in many skills including using computers to analyze diets, finding and using scientific references, understanding and criticizing scientific articles, and reviewing material presented in lectures.

NS 120 Nutrition and Health: Issues, Outlooks, and Opportunities
Spring. 1 credit. S-U grades only. Limited to 120 freshmen, sophomores, and juniors, others by permission of instructor. W 12:20. E. West.
A course for students interested in exploring careers in the broad fields of food, nutrition, and health. Experts representing different areas will discuss their work, focusing on current issues and trends as well as their requisite knowledge and skills. This course describes the many disciplines that are drawn upon in addressing human problems related to food, diet, and health. It also explores the related intellectual and career opportunities. This is not an introductory nutrition course for nonmajors.

NS 200 Vegetarian Nutrition: An Introduction
Fall. 3 credits. S-U grades optional. Prerequisites: NS 115 advised but not essential. T R 2:55–4:10. T. C. Campbell.
This introductory course will survey vegetarianism from a variety of nutrition and health considerations. The material to be presented and discussed will primarily include the empirical scientific evidence presented for easy comprehension for students without nutrition training. The course will also consider the historical and sociocultural roots, both ancient and of more recent times, that have led to the growing interest in, and acceptance of, this type of dietary practice. Particular attention will be given to the role of vegetarianism in the prevention and reversal of chronic degenerative diseases. Special topics on competitive sport, childhood nutrition, food preparation, and dietary transition will be offered. Internationally known guest speakers, will provide six to eight of the lectures.

NS 222 Maternal and Child Nutrition
Fall. 3 credits. Prerequisites: NS 115 and a college biology course or permission of the instructor. S-U grades optional. Limited to 25 students. Preregistration is required in room 309 MVR Hall. T R 1:25–2:40. C. Garza, P. Brannon.
Involves the study of nutritional requirements in pregnancy, lactation, infancy, and childhood through adolescence. Topics include the relationship between maternal diet and pregnancy outcome; analysis of different methods of infant feeding; and the nutritional status of pregnant women, children, and adolescents in the United States and in developing countries.

NS 245 Social Science Perspectives on Food and Nutrition
Fall. 3 credits. Prerequisite: NS 115. Letter grade only. T R 10:10–11:25. J. Sobal.
Theories, concepts, and methods from the social sciences will be used to examine food, eating, and nutrition. The course will use the food and nutrition system and the food choice process as conceptual models for examining the scope of social aspects of nutrition.

NS 247 Food for Contemporary Living
Fall and spring. 2 credits. Laboratory sections limited to 32 students. Preregistration during course preregistration required in 309 MVR Hall. Laboratory coat or apron required. Fall W 12:20–3:20; spring T 1:25–4:25 or R 9:05–12:05. M. Kamp.
Emphasizes meal planning for healthy individuals using national nutrition standards; the development of food preparation and presentation skills; the application of sensory evaluation techniques; food science principles as they apply to cooking and ethnic and cultural influences on cuisine.

NS 262 Nutrients and Cells
Spring. 3 credits. Prerequisites: one semester of biology and chemistry. M W F 9:05. N. Noy.
The course will focus on the relationship of the cells with the environment. Examples from three general areas will be considered: (1) mechanisms of uptake of nutrients by bacterial and by mammalian cells; (2) intracellular outcomes of nutritional stimuli: effects on metabolism and gene expression, toxicity; (3) and pathways of neutralization: detoxification, secretion, and DNA repair.

[NS 275 Human Biology and Evolution (also BIOEE 275 and ANTHR 275)
Fall. S-U grades optional, with permission of either instructor. Next offered 2002–2003.
See BIOEE 275 for course description.]

NS 300 Special Studies for Undergraduates
Fall or spring. Prerequisites: permission of instructor. S-U grades optional. DNS faculty.
Special arrangements can be made to establish equivalency for courses not transferred from a previous major or institution. Students prepare a description of the study they want to undertake using a form available from the College Registrar's Office. The form, signed by both the instructor directing the study and the associate director for academic affairs, is filed at course registration or during the change-of-registration period.

NS 306 Nutritional Problems of Developing Nations
Spring. 3 credits. Prerequisites: NS 115. S-U grades optional. T R 10:10. Offered alternate years. M. C. Latham.
The course is designed for undergraduates interested in the nutritional problems of developing countries. Attention is given to the array of nutritional problems encountered, the causes of hunger and malnutrition, the epidemiology of the major nutritional problems afflicting poor nations, the functional consequences of these problems on individuals and societies, and the types of programs that can be implemented to improve health and nutrition.

NS 315 Obesity and the Regulation of Body Weight (also Psychology 613)
Spring. 3 credits. Prerequisites: NS 115, Psych 101. Limited to juniors and seniors. S-U grades optional. Offered alternate years. Not offered 2002–03. T R 1:25–3:00. D. Levitsky.
This course is a multidisciplinary discussion of the causes, effects, and treatments of human obesity. Topics include the biopsychology of eating behavior, the genetics of obesity, the role of activity and energy metabolism, the psychosocial determinants of obesity, anorexia nervosa, therapy and its effectiveness, and social discrimination.

NS 320 Introduction to Human Biochemistry
Fall. 4 credits. Prerequisites: one year college biology; one year college general chemistry; and CHEM 257 or 357–358; or permission of the instructor. S-U grades optional. M W F 10:10, sec T 1:25. W. Arion, P. Stover.
The principles of biochemistry are presented within the context of human health and disease. Metabolism of carbohydrates, lipids, proteins, and selected micro-nutrients is taught from a perspective that emphasizes their role in supporting the structure and physiological functions of the major organs of the body, including the blood. The concepts of enzyme catalysis, enzyme regulation, hormone action, and bioenergetics are incorporated within this framework. The fundamental concepts of eucaryotic DNA structure, function, and gene expression are covered with reference to their importance in regulating metabolism and the impact of a changing nutrient environment.

NS 331 Physiological and Biochemical Bases of Human Nutrition
Spring. 4 credits. Prerequisites: Biological Sciences 330, or 331, or NS 320, or equivalent. S-U grades optional. Lec M W F 10:10; disc, W or R. M. Stipanuk, C. McCormick.
This course examines the biochemical and physiological bases of human nutritional requirements. The instructors use an integrated approach to cover the digestion and metabolism of the nutrients (carbohydrates, proteins, lipids, vitamins, and minerals). Metabolic and chronic diseases that are related to nutrition are discussed throughout the semester. The discussion sections and problem sets provide an opportunity to examine in greater depth selected topics from lecture.

NS 332 Methods in Nutritional Sciences
Fall and spring. 3 credits. Each section limited to 18 students. Prerequisites: NS 345, NS 331 preferred or concurrent registration. Laboratory preregistration during course preregistration required in 309 MVR. One evening prelim to be scheduled. Fall. Lec M 12:20; lab M W 1:25–4:25 or T R 10:10–1:10. Spring. Lec M 12:20; labs M W 1:25–4:25 or T R 10:10–1:10. J. T. Brenna, M. N. Kazarinoff.
Laboratory introduction to principles and analytical techniques of nutritional research. Emphasis is on analytical concepts and skills required to determine nutrient function and nutritional status of individuals. Topics include methods of nutrient, metabolite, and enzyme analysis in body fluids, and methods for assessing individual food intake and nutritional status.

NS 341 Human Anatomy and Physiology
Spring. 4 credits. Letter grade only. Prerequisites: college biology; NS 115 recommended. **Completion of laboratory permission forms required in 309 MVR during course enroll period. Limit 18 per lab. Attendance is required at first lab, or you will forfeit your placement. For further information go to room 309 MVR.** Lec M W F 11:15, lab W or R or F 9:05–11:00, or 2:30–4:25. V. Utermohlen.
Introduction to human anatomy and physiology with particular emphasis on aspects of relevance to the nutrition sciences and medicine. All major organ systems will be covered. Laboratories will emphasize location, recognition, and description of anatomical structures. Testing of physiological functions will focus on the tests with nutritional and medical relevance.

NS 345 Nutritional and Physicochemical Aspects of Food
Spring. 3 credits. Prerequisite: college course in organic chemistry or biochemistry. S-U grades optional. T R 1:25–2:40. B. Parker, B. Lewis.
A study of the nutritional, physical, and chemical properties of foods including composition, food structure, enzymic and nonenzymic phenomena, and processing/preparation aspects. Issues related to food safety, regulation, and food composition data bases will also be discussed.

NS 346 Introduction to Physiochemical Aspects of Foods—Laboratory
Spring. 1 credit. Each section limited to 18 students. Limited to dietetics students in DNS. Prerequisites: NS 345 or concurrent registration; a college course in organic chemistry and permission of instructor during course registration (permission-of-instructor forms must be obtained from and returned to 309 MVR). Letter grade only. M 12:20–3:20 or T 9:05–12:05. B. Parker, B. Lewis.
Laboratory exercises are designed to illustrate principles related to food quality and ingredient functionality, and to introduce students to the analytical methodology associated with food evaluation.

[NS 347 Human Growth and Development: Biological and Behavioral Interactions (also Human Development 347 and Biology and Society 347)
Spring. 3 credits. Prerequisites: Biological Sciences 101 or 109 or equivalent; Human Development 115 or Psychology 101 or equivalent. M W F 1:25. Offered alternate years. Next offered 2002–2003. J. Haas, S. Robertson.
This course is concerned with the interrelationships of physical and psychological growth and development in humans, particularly during infancy. Intrinsic and extrinsic causes of variations in growth, including various forms of stimulation, are considered. In addition, the consequences of early growth and its variation for current and subsequent behavioral, psychological, and physical development are examined. The interaction between physical and behavioral or psychological factors is emphasized throughout the course.]

NS 361 Biology of Normal and Abnormal Behavior (also PSYCH 361)
Fall. 3 credits. Prerequisites: Biological Sciences 101–102 and Psychology 101, or permission of the instructor. A fundamental knowledge of biology and psychology is essential. S-U grades optional. Limited to juniors and seniors. M W F 9:05. B. Strupp.
A critical evaluation of biological factors thought to influence behavior and/or cognitive functioning. Biological, psychological, and societal influences will be integrated. Topics include nutrition and behavior, psychiatric disorders, developmental exposure to environmental toxins and abused drugs, biopsychology of learning, memory, intelligence, and related cognitive disorders.

NS 378 Food, Nutrition, and Service Management
Fall. 3 credits. Prerequisites: NS 115, NS 247 or permission of instructor. T R 1:25–2:40. M. Kamp.
The course discusses how management principles and theories apply to foodservice operations and nutrition services. The systems concept of organization is utilized. Emphasis is placed on leadership development, decision making/problem solving as it relates to procurement, production, distribution, and quality assurance in food and nutrition services. Menu development projects demonstrate the interrelationships of nutrition, labor, equipment, food costs, and customer satisfaction. Marketing strategies and implementation are discussed. Teamwork and negotiating skills are emphasized.

NS 380 Integrating Food Systems and Human Nutrition Needs
Spring. 2 credits. Prerequisites: NS 115 or FOOD 200 or An Sc 100. Letter grade only. T R 8:40–9:55. G. Combs.
This is a student-centered course that uses case studies to examine the link between human nutrition and health issues to those involved in systems of food production and distribution. Student teams will investigate new and existing technological options within food systems that can be used to address domestic or international human nutrition needs.

NS 398 Honors in Nutritional Sciences
Fall. 1 credit. Limited to students admitted to the division honors program. S-U grades only. T 12:20. M. Kazarinoff.
Research design. Analysis of research papers on selected topics.

NS 400–401–402–403 Special Studies for Undergraduates
Fall or spring. Credits to be arranged. S-U grades optional. Division faculty.
For advanced independent study by an individual or group of students who want to study a field of nutritional sciences not otherwise provided through course work in the division or elsewhere in the university. Students prepare a description of the study they want to undertake on a form to be signed by the instructor directing the study and the associate director for academic affairs. The form, available from the department office, is filed at course registration or within the change-of-registration period along with an add/drop slip in 145 MVR, College Registrar Office. To ensure review before the close of the course registration or change-of-registration period, students should submit the special-studies form to the associate director for academic affairs as early as possible.

NS 400 Directed Readings
For study that predominantly involves library research and independent reading.

NS 401 Empirical Research
For study that predominantly involves data collection and analysis or laboratory or studio projects.

NS 402 Supervised Fieldwork
For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

NS 403 Teaching Apprenticeship
For study that includes assisting faculty with instruction.

NS 421 Nutrition and Exercise
Spring. 3 credits. Prerequisites: BIOAP 311 or NS 341 and NS 115 or NS 331 preferred. Limited to nutrition majors, others by permission of the instructor. S-U grades optional. Lec T R 11:15, Sec T, or R, or F 8:00–9:55. S. Travis.
Designed for nutrition majors, students in this course will examine the interaction between nutrition, exercise, and athletic performance. Topics will include the biological, psychological, and sociological aspects of nutrition as it relates to exercise performance. Lectures will cover current research on nutritional needs in response to exercise including: fluids, energy nutrient requirements and caloric distribution, supplementation, ergogenic aids, pre/post event recommendations. Applications will be made to various sports. Critical thinking skills will be enhanced by critiques of studies on sports nutrition related topics and the evaluation of popular sports nutrition claims. Students will learn educational strategies for communicating with the recreational and professional athlete, coach, and trainer.

NS 425 Nutrition Communications and Counseling
Spring. 3 credits. Prerequisites: NS 115, NS 245. Limited to dietetics majors. S-U grades optional. M W F 1:25. S. Travis.
Students will come to understand the theoretical basis of effective health promotion communications and to develop effective nutrition communication skills through application in a variety of settings. The course will provide hands-on experiences in counseling, educational program development, and oral and written communications.

NS 431 Mineral Nutrition and Chronic Disease
Fall. 3 credits. Prerequisites: NS 331, An Sc 410, or permission of instructor. S-U grades optional. T R 11:15. C. McCormick.
We will evaluate the evidence that diet plays a role in osteoporosis and hypertension and consider whether iron status affects the development of heart disease and inflammation. An additional goal of the course is to review the data upon which recommendations for daily nutrient intakes are currently based, and the biological basis of current recommendations. Class discussion of key research articles will be conducted and evaluated.

NS 441 Nutrition and Disease
Fall. 4 credits. Prerequisites: NS 331 and a human physiology course. S-U grades optional. M W F 10:10; F 8:00. V. Utermohlen.

Study of the anatomical, physiological, and metabolic abnormalities in acute and chronic illness, and the role of nutritional therapy in their prevention and care. Topics covered include: nutritional assessment, nutritional pharmacology, starvation, infection, trauma, cancer, diabetes mellitus, and renal, cardiovascular, pulmonary, skeletal, neurological, liver, and gastrointestinal disorders.

NS 442 Implementation of Nutrition Care
Fall. 3 credits. Prerequisites: NS 247, concurrent registration in NS 441 (or equivalent background in either course). S-U grades optional. Lec M W F 9:05. TBA.
Development of skills necessary to implement nutrition care in clinical settings: nutrition screening, dietary assessment, principles of medical nutrition therapy, menu planning for disease states, the role of other allied health practitioners in assuring nutritional health, and reimbursment and legislation in dietetics practice.

NS 450 Public Health Nutrition
Spring. 3 credits. Prerequisites: NS 115, and one course dealing with population-level studies, e.g., NS 245, HDFS 150, PAM 201, PAM 303, RSOC 100, RSOC 200. M W F 11:15. K. Rasmussen, D. Pelletier.
Public health nutrition is the major professional career track for nutritionists outside of dietetics. It deals with efforts to improve the diets and nutritional status of whole populations by working at the community, state, and national level. This course helps prepare students to work in public health nutrition by describing methods used in the assessment of nutrition problems, development of nutrition-related policies, and delivery of health, nutrition, and food assistance programs.

NS 451 Epidemiology and Health of Human Communities
Fall. 3 credits. Prerequisite: one semester of statistics (can be taken concurrently). M W F 1:25. E. Frongillo.
Examines through a series of case studies, the role of epidemiological investigation in understanding, assessing, and improving the health and nutrition of human communities and populations. Students will read and discuss scientific research and public policy literature on specific topics of current interest. Emphasis is on the conceptualization of epidemiology as an ecological science that studies the interdependence and interaction of humans with their social, cultural, and physical environment. Intended for advanced undergraduates and graduate students with an interest in health, human biology, nutrition, or epidemiology.

NS 452 Molecular Epidemiology and Dietary Markers of Chronic Disease
Spring. 3 credits. Prerequisites: upper level biology course, introductory statistics course (can be taken concurrently), or permission of the instructor. S-U grades Optional. T R 10:10–11:25. P. Cassano.
This course provides an introduction to chronic disease epidemiology, and covers the natural history of the major chronic diseases affecting the U.S. population. The course focuses on the use of biological markers in understanding the etiology of cardiovascular disease, cancer, and lung disease. The course integrates biological and epidemiological information, as well as public health considerations and concepts related to the prevention of disease. Topics include gene-nutrient interaction in relation to cardiovascular risk, micronutrients and cancer risk, and nutritional influences on the immune system in relation to asthma risk. The course will provide a health context that will enrich the learning experience in other advanced courses, particularly in biology and nutrition.

NS 457 Economics of Hunger and Malnutrition (also ECON 474)
Spring. 3 credits. Prerequisites: ECON 101 and introductory statistics, or permission of the instructor. S-U grades optional. M W F 9:05. D. Sahn.
This course focuses on the analysis of global hunger and malnutrition. We will analyze the dimensions, causes, and solutions to hunger and malnutrition, particularly in developing countries. Grades will be based on a mid-term and a final exam, a term paper, and class participation.

NS 475 Molecular Nutrition and Development
Spring. 3 credits. Prerequisites: Chem 207–208 or equivalent, Chem 357–358 or equivalent, BioBM 330 or equivalent. S-U grades optional. M W F 9:05. Offered alternate years. Not offered 2002–03. P. Stover, D. Noden.
This course explores the role of maternal nutrition, maternal genotype, and placental function in mammalian embryo development. The role of vitamins and nutrients including folic acid, vitamins A and D, iron, and cholesterol in cellular and morphogenic processes during development are discussed at the molecular level. The course is based on the current primary literature and concentrates on the modern experimental approaches used to address these relationships including mutagenic, transgenic, cell and fetal culture models.

NS 488 Applied Dietetics in Foodservice Systems
Spring. 3 credits. Limited to 27 students. Prerequisites: NS 378, Micro 290. Laboratory preregistration during course preregistration is required in 309 MVR. White lab coat is required. Approximately $25.00 will be needed for special supplies/activities. Lec M W 9:05; labs, W or R 2:30–6:30. M. Kamp.
Students will gain experience in facility design; equipment selection, use, and care; job analysis and evaluation; human resources planning; management of financial resources; recipe development and volume food production; computer-assisted management; employee training; applied safety and sanitation standards; and will develop other skills required to operate/manage a foodservice program. The application of quality management in food service operations and facility management is stressed. Laboratories will be arranged through Cornell Dining.

NS 498 Honors in Nutritional Sciences
Spring. 1 credit. Limited to students admitted to the division honors program. Students may register in NS 499 concurrently. M or F 2:30. M. Kazarinoff and division faculty.
Juniors (Mondays). Discussion of research opportunities in nutrition and orientation to research facilities. Delineation of honors research problems in consultation with faculty mentors. Seniors (Fridays). Workshop sessions on honors thesis and oral presentation preparation.

NS 499 Honors Problem
Fall and spring. Credits to be arranged. Open only to students in the division honors program. M. Kazarinoff and division faculty.
An independent literature, laboratory, or field investigation. Students should plan to spread the work over two or more semesters.

NS 600 Special Problems for Graduate Students
Fall or spring. Credit to be arranged. Limited to graduate students recommended by their chair and approved by the instructor in charge. S-U grades optional. Division faculty.
Emphasis on independent advanced work. Experience in research laboratories in the division may be arranged.

[NS 601 Proteins and Amino Acids (also AN SC 601)
Spring. 2 credits. Prerequisites: physiology, biochemistry, and nutrition. Offered alternate years. W F 12:20. Next offered 2002–2003. R. E. Austic.
The course emphasizes the dynamic aspects of protein digestion and absorption, amino acid transport, and amino acid and nitrogen metabolism and their relationships to the nutritional requirements for amino acids.]

NS 602 Lipids (also BIO AP 619)
Fall. 2 credits. T R 11:15. A. Bensadoun.
Advanced course on biochemical, metabolic, and physiological aspects of lipids, more specifically lipid transport. Topics covered include lipid methodology, structure of plasma lipoproteins, molecular biology and cell biology of apolipoproteins, lipoprotein receptors, lipid transfer factors, lipolytic enzymes, and atherosclerosis.

[NS 603 Mineral Nutrition: Metabolic, Health, and Environmental Aspects (also AN SC 603)
Fall. 2 credits. Letter grade only. Prerequisites: biochemistry, physiology, and nutrition. T 2:20–4:25. Offered alternate years. Next offered 2002–2003. X. G. Lei, G. F. Combs, Jr.
The course emphasizes the metabolic roles and environmental impacts of mineral nutrition in animal, human, and food systems. Team-taught lectures include general biochemical and physiological aspects of mineral metabolism and specific mechanisms of gene expression regulation and mammal health disorders associated with individual elements. Methodology and facility of mineral research is also discussed.]

NS 604 The Vitamins (also AN SC 604)
Fall. 2 credits. T R 10:10. G. Combs.
Text-based discussion sessions on nutritional aspects of the vitamins, including recent developments in nutritional and biochemical interrelationships with other nutrients and metabolites.

NS 605 Nutritional Biochemistry Colloquim
Fall and spring. 1 credit. S-U grades only. R 12:20. Nutritional biochemistry faculty.
Nutritional biochemistry colloquium is a graduate seminar series that focuses on recent advancements in biochemical nutrition. Weekly presentations are made by faculty, postdocs, and graduate students, and are based on the primary literature. The presentations are followed by a discussion involving all participants.

NS 607 Nutrition as an Integrating Discipline: Concepts and Paradigms
Fall. 3 credits. Prerequisite: some prior coursework or experience in nutrition, or permission of the instructor. M W F 10:10. M. Kazarinoff, D. Pelletier, and division faculty.
An overview course for beginning graduate students which introduces them to the full breadth of nutritional science disciplines, including quantitative and qualitative sciences. Also suitable for seniors as an integrating course. The course presents concepts and paradigms of molecular biology, biochemistry, clinical nutrition, epidemiology, anthropology, economics, program planning and administration, policy development, and ethics. The course uses Vitamin A as the example. Emphasis will be placed on the integration of factual and conceptual knowledge to solve nutrition problems in human societies.

NS 611 Molecular Toxicology (also Toxicology 611)
Spring. 3 credits. Prerequisite: Toxicology 610 and a full-year 400-level course in biochemistry or equivalent. S-U grades optional. TBA. S. Bloom, R. Dietert.
A study of the fundamental biochemical mechanisms of absorption, transport, metabolism, and excretion of drugs, carcinogens, and toxicants. Emphasis is placed on oxidative and conjugative pathways of metabolism and of environmental and nutritional factors that influence toxicant metabolism and disposition. Methods of evaluating in vivo and in vitro metabolism are also addressed.

[NS 612 Methods of Assessing Physical Growth in Children
Spring. 3 credits. Limited to graduate students and undergraduate students who have permission of the instructor. A previous course in statistics required. S-U grades optional. Lec T 1:25; lab, R 1:25–4:25; disc T 2:15–3:05. Not offered 2001–2002. J. Haas.
A laboratory course to train students in methods and techniques used to assess the physical growth and development of children. The methods explored are those applicable for field, community, and clinical studies and cover anthropometry, body composition, skeletal age, maturity indicators, physical fitness, and energy expenditure.]

NS 614 Topics in Maternal and Child Nutrition
Fall. 3 credits. Prerequisites: NS 331, and 222 or 347, Biological Sciences 311, and permission of instructor. T R 8:30–9:55. K. Rasmussen.
An advanced course on the role of nutrition during pregnancy and lactation. The feeding and growth of infants and children in health and disease is considered. Critical evaluation of current literature is emphasized via lecture, discussions, and a term paper.

NS 617 Teaching Seminar
Fall or spring. 0 credit. Limited to division graduate students and students who have permission of the instructor. S-U only. C. Bisogni, D. Way.
Individualized instruction focusing on development of teaching skills for guiding classroom learning in lecture, discussion, and laboratory settings. Preparation of content, presentation, and interaction techniques and evaluative methods are emphasized in relation to the student's specific teaching assignment. Videotaped simulations provide opportunity for practice and analysis of teaching behaviors.

NS 618 Teaching Experience
Fall or spring. 0 credit. Limited to division graduate students and students who have permission of instructor. S-U only. C. Bisogni.
Designed to provide experience in teaching nutritional sciences by direct involvement in college courses under supervision of a faculty member. The aspects of teaching and the degree of involvement vary, depending on the needs of the course and the experience of the student.

NS 619 Field of Nutrition Seminar (also AN SC 619)
Fall or spring. 0 credit. S-U only. M 4:00. Faculty and guest lecturers.
Lectures on current research in nutrition.

NS 620 Food Carbohydrates (also Food Science 620)
Spring. 2 credits. Prerequisites: Biological Sciences 330 or equivalent. Letter grades only. T R 10:10. Offered alternate years. Not offered 2002–03. J. Brady, B. Lewis.
A consideration of the chemistry of carbohydrates, including sugars and complex carbohydrates (starches, pectins, hemicelluloses, gums, cellulose, and glycoconjugates). Emphasis is placed on intrinsic chemistry, functionality in food systems, and changes occurring during food processing and storage.

NS 626 Special Topics in Food
Fall. 2 credits. TBA. B. Lewis.
This course provides a discussion of current research on specific topics related to functional foods and nutraceuticals/phytochemicals.

NS 630 Anthropometric Assessment
Spring. 1 credit. Prerequisite: NS 331 or equivalent and permission of the instructor. 5 weeks only. W 1:25–4:25. J. Haas.
Topics covered in this lecture/lab course are: biological basis of anthropometry for nutritional status assessment, quality control of anthropometric data, applications to special groups (infants, children, adolescents, pregnant women, and elderly), statistical analysis and presentation of anthropometric data, references standards and interpretation, measurement techniques of anthropometry, and body composition assessment.

NS 637 Epidemiology of Nutrition
Spring. 3 credits. Limited to graduate students. Prerequisites: Biometry 601 and concurrent registration in Biometry 602 or equivalent knowledge. Basic knowledge about the nutritional aspects of growth and development and about nutritional biochemistry. TBA. J-P. Habicht.
This course covers principles of nutritional epidemiology, impact assessment of nutrition intervention programs, and nutritional surveillance. Principles of using nutritional information in decision making are presented. The course shows how the biochemistry and physiology of nutrition can be related to epidemiological assessment and research strategies.

NS 638 Epidemiology of Nutrition Seminar
Spring. 3 credits. Reserved for graduate students planning field intervention studies; by permission of instructor. Prerequisite: NS 637. TBA. J-P. Habicht.
Covers the meta-analysis, design, measurement, and analytic issues involved in developing, implementing, and analyzing studies of field interventions with nutritional impact.

NS 639 Epidemiology Seminar (also Statistics and Biometry 639)
Spring. 0–1 credit. Limited to graduate students; others by permission of instructor. Contact P. Cassano 255–7551 for permission and credit information. S-U grades only. M 12:20. P. Cassano.
This course will develop skills in the preparation and interpretation of epidemiological data by discussing current research topics and issues.

NS 640 Social Science Theories in Nutrition
Fall. 3 credits. Limited to 20 graduate students. T R 10:10–12:05. J. Sobal.
Social science theories and paradigms from sociology, psychology, anthropology, economics, political science, geography, and history that contribute to understanding food, eating and nutrition will be discussed to understand how theories apply to nutrition topics, issues, and problems.

NS 644 Community Nutrition Seminar
Fall and spring. 1 credit. S-U only. Fall M 11:15, spring M 12:20. A. Gillespie and Cornell Community Nutrition faculty.
This seminar, sponsored by the Cornell Community Nutrition Program, focuses on research and program presentations in community nutrition, and related fields. Cornell faculty, graduate students, and invited outside speakers present research proposals, results from ongoing research, theoretical bases for research, program evaluations, and discuss current programs and issues in community nutrition. The format varies but always includes discussion by participants.

NS 646 Seminar in Physicochemical Aspects of Food
Spring. 1–3 credits. Prerequisite: a college course in organic chemistry or biochemistry. S-U grades optional. T R 1:25–2:40. B. Lewis, B. Parker.
An introduction to physicochemical aspects of food, for graduate students who have had limited or no work in this area. The seminar uses the lectures of NS 345 as a basis for supplementary readings and critical review of research on selected topics.

NS 650 Assessing Food and Nutrition in a Social Context
Fall. 4 credits. Prerequisite: course in Social Sciences. S-U grades only. T R 1:25–2:40. D. Pelletier, G. Pelto.
Food and nutrition problems in developed and developing countries may manifest themselves in biological or functional terms, but their causes and solutions ultimately are rooted in the socio-political world. This course provides multidisciplinary perspectives and some community experiences needed to assess and analyze the social context of nutrition problems. The course is relevant to developed and developing countries and to research and practice related to community nutrition as well as nutrition policy.

NS 651 Food and Nutrition Action in a Social Context
Spring. 3 credits. Prerequisites: at least 1 course in social sciences; NS 650 strongly recommended. S-U grades only. T R 1:25–2:40. D. Pelletier, G. Pelto.
This course builds upon the perspectives developed in NS 650. It provides a framework for combining socio-political considerations and analytical criteria in the planning, implementation, and evaluation of nutrition actions at community and policy levels. Case studies from the United States and developing countries are used extensively for examining a wide range of nutrition actions from the perspective of this integrated framework.

NS 660 Special Topics in Nutrition
Fall or spring. 3 credits maximum each term. Registration by permission of the instructor. Division faculty.
Designed for students who want to become informed in any specific topic related directly or indirectly to nutrition. The course may include individual tutorial study, experience in research laboratories, a lecture series on a special topic selected by a professor or a group of students, and/or selected lectures of another course already offered. Topics may be changed so that the course may be repeated for credit.

NS 680 International Nutrition Problems, Policy, and Programs
Spring. 3 credits. Prerequisite: permission of instructor. T R 11:15–12:30. Offered alternate years. Not offered 2002–2003. M. Latham.
Designed for graduate students who want to learn about the important nutritional problems of developing countries. The major forms of malnutrition related to poverty and their underlying causes are discussed. Emphasis is placed on programs and policies that can assist poor countries and communities to improve their nutritional and health status.

NS 685 Empirical Methods for the Analysis of Household Survey Data: Applications to Nutrition, Health, and Poverty (also ECON 771)
Spring. 3 credits. Prerequisites: introductory microeconomics, intermediate statistics (through multiple regression), or instructor's permission. M W 2:55–4:10. D. Sahn.
This course examines the role of government policy in alleviating poverty, food insecurity, and malnutrition in developing countries. Topics covered include methodologies for economic policy analysis of time use and food acquisition behavior, the "production" of nutritional outcomes, and the role of price policy and markets. Course readings draw largely on examples from Africa and Asia.

NS 690 Trace Element and Isotopic Analysis (also Chemistry 628)
Spring. 3 credits. Primarily for graduate students and advanced undergrads. Prerequisite: Chemistry 288 or 390, 302 or Chemistry 208 and Mathematics 112, or permission of instructor. S-U grades optional. T R 11:15. Offered alternate years. Not offered 2002–03. J. T. Brenna.
Survey course in modern high precision isotope ratio mass spectrometry (IRMS) techniques and trace/surface methods of analysis. Topics include dual inlet and continuous flow IRMS, thermal ionization MS, inductively coupled plasma MS, atomic spectroscopy, ion and electron microscopies, X-ray and electron spectroscopies, and biological and solid state applications. The first five weeks of CHEM 628/NS 690 focus on IRMS instrumentation and are offered as a separate 1 cr. special topics course (NS660).

NS 698 International Nutrition Seminar
Fall and spring. No credit. No grades given. R 12:20–1:10. J-P. Habicht, E. A. Frongillo.
This seminar series consists of presentations by Cornell faculty and graduate students, and by invited outside speakers. Speakers cover a range of topics relating to nutritional problems, policy, and programs in the nonindustrialized countries.

NS 699 Special Topics in International Nutrition
Fall and spring. 3 credits maximum each term. Registration by permission of instructor. Faculty in International Nutrition Program.
This option is designed for graduate students, mainly those with a concentration in international nutrition, who wish to become familiar with some specific topic related to international nutrition that is not adequately covered in an existing course. It usually consists of tutorial study on an agreed topic. Because the topics change, the course may be repeated for credit.

NS 700 Current Topics in Toxicology (also Toxicology 698)
Fall or spring. 1–3 credits. S-U grades optional. TBA. Staff.
A discussion of the most current developments in various areas of toxicological research and testing. Faculty and students will participate jointly in evaluating research findings and provide seminars and discussion of such material. For information regarding the topic, instructor, location, and credit, contact the office of the Graduate Field of Environmental Toxicology or go to http://www.cFe.cornell.edu/icet/seminars.htm.

NS 702 Seminar in Toxicology (also Toxicology 702)
Fall or spring. 1 credit. S-U grades only. F 12:20. Staff.
The seminar program covers varied topics in biochemical, genetic, nutritional, veterinary, and regulatory toxicology, ecotoxicology, and environmental chemistry. Included are presentations of basic research studies, fundamental concepts, and research activities involving environmental problems of a toxicological nature. Presentations are given by speakers from Cornell and visitors.

NS 703 Seminar in Nutritional Sciences
Fall and spring. 1 credit. S-U grades only. T 12:20 or W 12:20. Division faculty.
Presentations of original articles pertinent to the Nutritional Sciences. Students will learn how to make professional presentations and how to critique the presentations given by others. In addition, students will read and learn how to interpret original articles published in a wide variety of journals.

[NS 707 Nutrition as an Integrating Discipline: Evaluation, Criticism, Application
Fall. 3 credits. Prerequisites: advanced graduate standing and permission of the instructor. 2-hour class period per week plus discussion and workshop. M 1:25–3:20. Not offered 2001–2002. M. Kazarinoff, K. Rasmussen.
The goal of this course is to provide an integrative capstone learning experience for advanced graduate students with majors or minors in nutrition. Groups of students will focus on a series of special problems in nutrition drawn from those currently faced by nutrition professionals. Special problems may involve assuming the role of consultants, expert committee members or peer-reviewers who are charged with answering questions or formulating recommendations related to research, programs, or policies.]

NS 899 Master's Thesis and Research
Fall or spring. Credit to be arranged. Prerequisite: permission of the chair of the graduate committee and the instructor. S-U grades optional. Division graduate faculty.

NS 999 Doctoral Thesis and Research
Fall or spring. Credit to be arranged. Prerequisite: permission of the chair of the graduate committee and the instructor. S-U grades optional. Division graduate faculty.

FACULTY ROSTER

Arion, William J., Ph.D., U. of N. Dakota. Prof.
Bensadoun, Andre, Ph.D., Cornell U. Prof., Nutritional Sciences/Physiology
Bisogni, Carole, Ph.D., Cornell U. Prof. and Associate Director for Academic Affairs
Brannon, Patsy, PhD., Cornell U. Professor and Dean, College of Human Ecology
Brenna, Thomas, Ph.D., Cornell U. Assoc. Prof.
Campbell, T. Colin, Ph.D., Cornell U. Jacob Gould Schurman Professor of Nutritional Biochemistry
Cassano, Patricia, Ph.D., U.of Washington. Asst. Prof.
Chen, Junshi, M.D., Peking Medical College, China. Adjunct Prof.
Combs, Gerald F. Jr., Ph.D. Cornell U. Prof.
Devine, Carol M., Ph.D., Cornell U. Asst. Prof.
Dollahite, Jamie, Ph.D., U. Texas. Assoc. Prof. and EFNEP Leader
Frongillo, Edward, Jr., Ph.D. Cornell U. Assoc. Prof.
Garza, Cutberto, M.D., Baylor College; Ph.D., MIT. Prof.
Gillespie, Ardyth, Ph.D., Iowa State U. Assoc. Prof.
Haas, Jere D., Ph.D., Pennsylvania State U. Director and Nancy Schlegel Meining Professor in Maternal and Child Nutrition
Habicht, Jean-Pierre, Ph.D., Massachusetts Inst. of Technology. James Jamison Professor of Nutritional Epidemiology
Kamp, Marie, MBA, Oklahoma City U. Lecturer
Kazarinoff, Michael N., Ph.D., Cornell U. Assoc. Prof., Nutritional Sciences/Biochemistry, Molecular and Cell Biology
Latham, Michael C., D.T.M.&H., U. of London (England). Prof.
Levitsky, David A., Ph.D., Rutgers U. Prof.
Lewis, Bertha A., Ph.D., U. of Minnesota. Assoc. Prof.
Manor, Danny, Ph.D., Albert Einstein College of Medicine. Assoc. Prof.
McCormick, Charles, Ph.D., North Carolina St. U. Assoc. Prof.
Noy, Noa, Ph.D., Tel-Aviv U. (Israel), Assoc. Prof.
Olson, Christine M., Ph.D., U. of Wisconsin. Prof.
Parker, Robert S., Ph.D., Oregon State U. Assoc. Prof.

Pearson, Thomas, Ph.D., Johns Hopkins U. Adjunct Prof.
Pelletier, David, Ph.D., The Pennsylvania State U. Assoc. Prof.
Pelto, Gretel, Ph.D., U. Minnesota. Prof.
Rasmussen, Kathleen M., Sc.D., Harvard U. Prof.
Rivera, Juan, Ph.D., Cornell U. Adjunct Asst. Prof.
Sahn, David, Ph.D., M.I.T. Prof.
Sobal, Jeffery, Ph.D., U. of Pennsylvania. Assoc. Prof.
Stephenson, Lani, Ph.D., Cornell U. Assoc. Prof.
Stipanuk, Martha H., Ph.D., U. of Wisconsin. Prof.
Stover, Patrick, Ph.D., Med. College of Virginia. Asst. Prof.
Strupp, Barbara, Ph.D., Cornell U. Assoc. Prof.
Travis, Susan, M.S., Colorado State. Lecturer
Utermohlen, Virginia, M.D., Columbia U. Assoc. Prof., Nutritional Sciences/Biochemistry, Molecular and Cell Biology

Other Teaching Personnel

West, Elise, M.S., Cornell U. Teaching and Curriculum Specialist

Joint Appointees

Bauman, Dale, Prof., Animal Science/ Nutritional Sciences
Miller, Dennis, Prof., Food Science/Nutritional Sciences

OFFICER EDUCATION

Military instruction began at Cornell University in 1868 under the provisions of the Morrill Act of 1862. Since that time, officer education has been highlighted by the construction of Barton Hall in 1914 and the establishment of a formal Reserve Officers Training Corps (ROTC) unit in 1917. The program evolves to keep pace with the latest military changes and emphasizes the development of leadership and managerial skills.

The Officer Education Programs prepare students for a commission as an officer in either the United States Army, Navy, Air Force, or Marine Corps. Each service program is headed by a senior military officer who also serves as a full professor on the Cornell faculty.

MILITARY SCIENCE

Lieutenant Colonel Robert Sova, Aviation (AV), United States Army, Professor of Military Science and Commanding Officer, U.S. Army ROTC Instructor Group

Major Brian Edholm, Military Intelligence, United States Army

Captain Richard Brown, Engineer, United States Army

Captain Michelle McKeown, Air Defense Artillery, United States Army

United States Army ROTC Program

The primary objective of the Army Officer Education Program at Cornell is to commission the future officer leadership of the United States Army. Intermediate objectives are to provide students with an understanding of the fundamentals of responsibility, integrity, and self-discipline, as well as an appreciation of the citizen's role in national defense. The application of the decision-making process to a variety of situations is given major emphasis as a valuable aid in developing leadership potential. These objectives are achieved through a program normally covering four years. A two-year program is available for those who qualify. The program includes specific courses in military science, more general academic subjects that assure a well-rounded education, practical training in leadership through participation in the Cadet Corps (including attendance at one five-week summer camp at Ft. Lewis, Washington), and the opportunity to participate in a number of extracurricular activities. This combination prepares the student for commissioning and effective performance in the many branches of the Army. This student's academic major, academic performance, leadership ability, personal desires, and the needs of the Army determine the branch of the Army into which the student is commissioned upon graduation.

Requirements for Enrolling

Applicants must be citizens of the United States and be able to obtain a Secret level security clearance prior to being commissioned as lieutenants. (Noncitizens may enroll in selected portions of the program.) Students must meet Army medical requirements. Overall sound mental and physical condition is essential; students are required to undergo periodic physical fitness tests. Enrollment and continuation in the program is subject to the approval of the Professor of Military Science. Enrollment in specific courses by students not formally enrolled in the program must be approved by course instructors. Contracted students must register for letter-grade military science classes and leadership laboratories for the purpose of commissioning into the United States Army.

Four-Year Program

The Four-Year Program is open to students in their freshman year or, with the approval of military and university authorities, to sophomores in a five-year degree program. Veterans of the Armed Forces of the United States and students entering Cornell with AROTC credit from secondary or military schools (Junior Division AROTC) may receive advanced standing, if qualified. Under the Four-Year Program students enroll in the Basic Course (Mil S I and II) during the first two years, and the Advanced Course (Mil S III and IV) during the next two years. A total of 12 credits of military subjects are taken. In addition, academic enrichment courses are required in such fields as written communications, computer science, and military history. All cadets attend a five-week camp, with pay, between their junior and senior years. All cadets participate in physical fitness training three days per week. Each year selected cadets are sent to the Army Airborne School, Winter Survival School, and Air Assault Course, depending upon availability and student standings within the ROTC program.

Basic Course (MIL S I and MIL S II)

Students in the first year of the Basic Course take one classroom course in military science in the fall and spring semesters, for which they receive academic credit depending upon their college. These courses include study of the U.S. organization for defense and principles and techniques of leadership and management.

Students also participate in leadership modules that include rappelling, orienteering, drill and ceremony, physical training, winter survival, rifle marksmanship, historical site visits, land navigation, interpersonal communication, and individual tactical training. These modules are designed to promote personal development and enrichment. While they do not receive academic credit for these activities, students may receive physical education credit. Typical freshman participation in Army officer education is 6 program-related hours per week.

In the fall of the second year, students take a two-credit course in American military history.

In the spring of the second year, students take a one-credit course in leadership theory and spend approximately two hours a week in practical leadership training, land navigation, and military skills.

Advanced Course (MIL S III and MIL S IV)

The Advanced Course of the Four-Year Program is open to students who have successfully completed the Basic Course and are accepted by the Professor of Military Science for further enrollment. It is also open to students who have gained appropriate advanced standing through either successful completion of Basic Camp, a six-week summer training camp, or prior military training. Students entering the Advanced Course must have the equivalent of four academic semesters remaining at Cornell or another degree-granting institution. Students must pass required physical and aptitude tests. In addition, the past performance and desire of each student is evaluated to determine potential for eventual commissioning.

When students are accepted for the Advanced Course or accept a scholarship, they sign a written contract with the U.S. government. Under the terms of the contract, they agree to complete the Advanced Course and to accept a commission if offered. Concurrently with the signing of the contract, students enlist in the United States Army Reserve.

Classroom study in the Advanced Course includes one military science course each semester on such subjects as leadership and management, small-unit tactics, and command and staff organization and functions. The two hours a week of practical leadership training continues, and between the junior and senior years all cadets attend a five-week advanced summer camp conducted at Ft. Lewis, Washington.

Scholarships

Scholarships are awarded on the basis of merit and may be available for two, three, or four years. AROTC scholarships are awarded each year to outstanding Basic Camp participants and students in the freshman and sophomore classes. Scholarships pay up to $17,000 toward tuition and mandatory fees. Scholarship cadets and Advanced Course cadets also receive between $200 and $400 a month for up to ten months a year. Scholarship cadets also receive $510 per year toward the cost of text books.

Commissioning

All students who successfully complete the Advanced Course, including the advanced summer camp, are commissioned as second lieutenants in the United States Army upon graduation.

Service Obligations

ROTC graduates may serve on Active Duty, in the Army Reserve, or in the National Guard, depending upon the needs of the Army and the leadership abilities of the cadet. Officers beginning active duty attend the Officer Basic Course (normally 10 to 16 weeks) of their assigned branch. Upon completion, officers

are assigned to a unit and location determined by the desires of the individual and the requirements of the Army. Officers selected for reserve duty attend the Officer Basic Course, after which they are released to reserve status.

ROTC graduates generally serve four years on active duty and four years in reserve status; however, some may serve eight years on reserve duty.

Choice of Branch

Cadets in the second year of the Advanced Course (normally the senior year) may specify the branch of the Army—such as Infantry, Armor, Field Artillery, Air Defense Artillery, Aviation, Corps of Engineers, Signal Corps, Military Police, Military Intelligence—in which they prefer to serve. They are notified in December of the branch to which they are assigned. Appointment in a chosen branch depends upon the student's academic and officer education performance, degree area, and the needs of the Army at that time.

Graduate Study

Active duty deferments, or educational delays, may be granted to individuals who want to attend graduate school at their own expense. Requests will be considered on the basis of the needs of the service. Admission to graduate school is the student's responsibility.

Benefits

Each cadet in the Advanced Course (Mil S III and Mil S IV) receives $200 a month for up to 10 months a year. While attending the advanced summer camp (between the junior and senior years), each cadet receives approximately $700. A cadet in the Two-Year Program receives the same payments as cadets in the Advanced Course and, in addition, receives approximately $700 for summer Basic Camp attendance before entering the Advanced Course.

Military Science Courses

All cadets take one course and a leadership laboratory each semester in military science. The number of hours a week spent in the classroom varies from semester to semester, as does the credit received for each course.

Freshman Year (MIL S I)

MIL S 101 United States Organization for Defense
Fall. 1 credit. Required. B. Edholm.
Students examine the U.S. defense structure in terms of organization, mission, personnel, and relationships among and between military forces and branches and departments of the government. The U.S. Army force structure is examined at all levels. The complexities and magnitude of operating the defense organization are studied to provide a framework for subsequent instruction. Students develop skills in conducting oral and written presentations.

MIL S 102 Leadership Theory
Spring. 1 credit. Required. B. Edholm.
This course allows students to develop a basic understanding and appreciation of theories of social and organizational psychology and behavior as they apply to the military setting. Attention is given to leader types, the source and exercise of authority, and the impact of varying styles of leadership, resource management, motivation, and organizational effectiveness. The student is instructed in the concepts of integrity, ethics, and professionalism. Classes on historical events and strategy are also presented.

Sophomore Year (MIL S II)

MIL S 222 Small Organizational Operations/Land Navigation
Spring. 1 credit. Required. Prerequisite: MIL S 102 or instructor approval. J. Lopez.
Students learn the basic principles of group dynamics at the level of the smallest military unit, the squad. Troop-leading procedures are introduced through case studies and role-playing exercises. Leadership theories introduced in MIL S 102 are examined in a variety of realistic settings. The practical application of behavioral theories is explored in the context of small military organizations. The course will also provide practical knowledge of the various forms of topographic representation. Students will use maps in terrain association and land navigation. Knowledge of topography is complemented by an orientation on significant environmental influences of physical, social, and climatic factors. Portions of the course offer experience in land navigation and orienteering.

MIL S 321 Armed Conflict in Society
Fall. 2 credits. Required. J. M. Keefe.
This course provides practical knowledge in American Military History. It is primarily an overview course designed to provide an understanding of the art and nature of warfare and particularly how warfare has affected the United States. The course consists of three primary areas of instruction with an emphasis on American military history. The first area of instruction addresses the art and theory of modern warfare. It analyzes America's first attempt at war, the American Revolution, and ends with the development of modern warfare under Napoleon Bonaparte. The second phase focuses on America at war in the nineteenth century. It places particular emphasis on the American Civil War and the strategy of annihilation versus the strategy of attrition. The final phase looks at warfare in the twentieth century and finishes with an analysis of the future of warfare for the military of the United States.

Junior Year (MIL S III)

MIL S 331 Theory and Dynamics of the Military Team
Fall. 2 credits. Required. R. Brown.
After an initial introduction to techniques of presenting briefings, students are provided with a broad understanding of the principles and application of teamwork in military organizations. Particular emphasis is given to the leadership responsibilities of the commander as the team coordinator. This course helps students develop an understanding of the roles and contributions of the various branches of the Army in support of the military team.

MIL S 332 Leadership in Small-Unit Operations
Spring. 2 credits. Required. Prerequisite: MIL S 331. R. Brown.
This course takes on the nature of decision making and the tactical application of the military team. Through the use of conferences and extensive practical exercises, students develop familiarity with the factors influencing a leader's decisions and the process of planning, coordinating, and directing the operations of military units through operation plans and orders.

Senior Year (MIL S IV)

MIL S 441 Leadership, Management, and Ethics for the Junior Military Officer
Fall. 2 credits. Required. J. M. Keefe.
This course provides an overview of the functions, responsibilities, and interrelationships among small-unit leaders, the commander, and the staff. Discussions focus on actions of small-unit leaders, communication skills, army operations, the logistical support of the army in the field, and the army training system. The course focuses on the dynamics of leadership in battle through the detailed analysis of a series of case studies. Just war theory, ethics, and professionalism are also addressed in a seminar fashion.

MIL S 442 Contemporary Military Environment
Spring. 2 credits. Required. J. M. Keefe.
A continuation of MIL S 441. Conferences and seminars examine the techniques of effective military leadership, with special attention given to professionalism and ethical considerations in the armed forces during both peacetime and conflict. Army operations and basic doctrine are also discussed. This is a capstone course designed to prepare the student for commissioning.

Practical Leadership Training

All Army Officer-Education Students

No credit is given for leadership training, but participation is required for successful completion of the AROTC program. Students receive physical education credit for the laboratory. Each semester, cadets register for the appropriate leadership laboratory, consisting of physical fitness training three times per week, two hours of military training each week, and one or two weekend training exercises per semester.

MIL S I Leadership Laboratory I

Fall.	Spring.
0 credits. S-U.	0 credits. S-U.
MIL S 151	MIL S 152

MIL S I cadets meet for two hours each week to learn a variety of military skills including rappelling, first aid, drill and ceremonies, weapons familiarization, and physical fitness training.

MIL S II Leadership Laboratory II

Fall.	Spring.
0 credits. S-U.	0 credits. S-U.
MIL S 251	MIL S 252

Cadets meet for two hours each week as members of the cadet organization to participate in practical leadership exercises. Types of practical activities include rifle marksmanship, orienteering, drill and ceremonies, signal communications, physical fitness training, first aid, tactics, and field exercises.

MIL S III Leadership Laboratory III

Fall. 0 credits.	Spring. 0 credits.
Required. S-U.	Required. S-U.
MIL S 351	MIL S 352

Cadets meet for two hours a week and ocassional weekends to prepare for a five-week summer camp that follows their junior year. Emphasis is placed on the development of individual practical and leadership skills. Cadets rotate through leadership positions to practice applying decision-making skills in a myriad of situations.

MIL S IV Leadership Laboratory IV

Fall. 0 credits. S-U. Required. MIL S 451

Spring. 0 credits. Required. S-U. MIL S 452

Senior cadets plan and operate the leadership laboratory programs for MIL S I–III cadets. The development of planning and supervisory skills is emphasized. Cadets have an opportunity to practice leadership skills developed during previous ROTC training and summer camp experiences. Includes two to three hours a week devoted to physical fitness.

Professional Military Education (PME) Requirements

In addition to the ROTC classes and leadership laboratories listed above, a number of courses are required as part of the contracted student's academic program. These courses are offered by the university and round out the student's professional education. The PME component of the ROTC program requires at least one college course in each of the following areas: communication skills, military history, and an introduction to computers. These courses must be completed prior to graduation and commissioning. Courses that meet these requirements are approved by the Professor of Military Science.

NAVAL SCIENCE

Captain J. Alley, United States Navy, Professor of Naval Science and Commanding Officer, Naval ROTC Unit

Lieutenant Colonel R. Minor, United States Marine Corps

Lieutenant S. Jordan, United States Navy

Lieutenant J. Lankford, United States Navy

Lieutenant J. Biondi, United States Navy

The objective of the Naval Officer Education Program is to prepare students for service as commissioned officers in the United States Navy or United States Marine Corps; this is done by supplementing undergraduate education with instruction in essential concepts of naval science and by fostering qualities of leadership, integrity, and dedication to country. The program is compatible with most undergraduate major fields of study, including five-year baccalaureate degree programs.

The program covers four years and combines specific courses in naval science and specified academic subjects. These courses supplement weekly professional development sessions in which the practical aspects of naval science and leadership procedures are stressed. It also includes at least one summer-at-sea period.

Though the Navy–Marine Corps Program has been designed to prepare future officers, naval science courses are open to all students at Cornell as space limitations allow.

Requirements for Enrollment

An applicant for the Naval ROTC program at Cornell must be a citizen of the United States. Applicants must have reached their seventeenth birthday by June 30 of the entering year and be less than 27 years of age on June 30 of the calendar year in which they are commissioned. Waivers of the upper age limit may be available for applicants who have prior active duty military service. Applicants must also meet physical and medical requirements. Interested students can visit the Naval ROTC Unit in Barton Hall or contact their local officer recruiter.

Programs

There are two programs: the Scholarship Program and the College Program. The two programs differ primarily in benefits given to the student.

Scholarship Program

The Scholarship Program provides approximately 1,000 scholarships in more than 60 universities nationwide to selected students who want to serve in the Navy or Marine Corps. Financial support is provided to students during college preceding the award of the baccalaureate degree.

Benefits

The program offers scholarships that provide *full tuition* and are not need-based. While on scholarship, students also receive money for instructional fees, textbooks, nonconsumable supplies, and a $200-a-month stipend for a maximum of 40 months.

Successful completion of the Scholarship Program leads to a commission in the Navy or Marine Corps Reserve. At Cornell University, over 90 percent of NROTC students have a scholarship. Students entering NROTC without a prior scholarship award are entitled to compete for two- or three-year scholarships controlled by the Chief of Naval Education and Training.

Entering the Scholarship Program

There are three ways to enter the Scholarship Program.

The first way is by applying to the national competition each year. This process entails filling out and submitting an appropriate application; being interviewed; having a physical examination; and applying to, and being accepted by, one of the colleges or universities throughout the country that offers an NROTC program.

The second way is by enrolling in the College Program at Cornell and being recommended by the Professor of Naval Science for a scholarship after at least one semester in the program.

The third way is by entering through the Two-Year Scholarship Program.

College Program

There are two College Programs available. Both lead to a commission in the Naval or Marine Corps Reserve.

Starting in the junior year, each of these programs provides textbooks for naval science courses, uniforms, and a subsistence allowance of $200 a month.

The regular College Program is four years long. Academic requirements for students in this program are somewhat fewer than those for scholarship students, as noted in the curriculum section of this booklet.

The Two-Year College Program begins the summer before the junior year; students attend a required program, with pay, at the Naval Science Institute in Newport, R.I.

Summer Training

Each summer, students in the Scholarship Program spend approximately four to six weeks on a Navy ship, or participate in a naval activity that may take place anywhere in the world, for on-the-job training. College Program students attend one summer training session of the same duration between the junior and senior years.

Active Duty Requirements

Scholarship midshipmen commissioned in the Navy or Marine Corps Reserve serve on active duty for a minimum of four years. College program midshipmen commissioned in the Naval or Marine Corps Reserve serve a minimum of three years. In somes cases, following commissioning, specialized training such as aviation or nuclear power will add additional active duty requirements.

Choice of Assignment

Graduates have the opportunity to request the duty they prefer upon graduation. These requests are given careful consideration, and every effort is made to assign newly commissioned officers to their duty of choice.

Among the assignments available are duties in naval aviation as either a pilot or naval flight officer, on submarines, and on surface ships. Other specialties, such as special warfare or medical service corps, may be available on a limited basis.

Marine Corps Options

The United States Marine Corps is an integral part of the Naval Services and is commanded by the Commandant of the Marine Corps. One-sixth of the NROTC scholarship students may be Marine selectees who will be designated Marine-option midshipmen. Upon successful completion of the program they will be appointed second lieutenants in the United States Marine Corps Reserve.

Marine-option midshipmen follow the same program as other NROTC midshipmen for the first two years. Beginning with the junior year, Marine-option midshipmen are taught Marine oriented courses by a Marine Officer Instructor. For First Class summer training (after the junior year), Marine-option students travel to Quantico, Virginia, where they undergo six weeks of intensive training known as the USMC Officer Candidate School. Upon commissioning the following year as second lieutenants, they are assigned to the Basic School at Quantico, Virginia. After the Basic School, the Marine officer is assigned duty in a variety of occupational fields. Among the duties available are infantry, aviation, artillery, tracked vehicles, engineering, communications, electronics, supply, administration, and computer science. The officer may serve on board naval vessels or at shore installations of the Marine Corps or Navy, either in this country or overseas.

The Marine Corps has a postgraduate training system similar in objectives and organization to that of the Navy. Marine officers selected for aviation receive flight training at the Naval Air Station, Pensacola, Florida, along with their Navy counterparts.

Curriculum

A student has three categories of requirements to fulfill as a midshipman. The first of these requirements is a weekly naval professional

development session each semester. The second requirement is a naval science course each semester. The last set of requirements consists of further courses prescribed by the Navy to meet the growing need for more and better technically educated junior officers.

Naval Professional Laboratories

NAV S 141–142, 241–242, 341–342, or 441–442

All students in the program participate in one 90-minute professional development session each week. The session is held from 2:30 until 4:00 on Wednesday afternoons, and consists of both drill and professional information briefings. Students gain experience in actual leadership situations and learn the fundamentals of seamanship, military formations, movements, commands, discipline, courtesies, and honors. During information briefings, special emphasis is given to applied leadership as it relates to the administrative and managerial aspects of a Navy or Marine Corps officer's duties.

Naval Science Courses

All Navy and Marine midshipmen take one naval science course each semester during their freshman and sophomore years. Navy-option students continue to take a naval science course each semester during their junior and senior years. Marine-option students have slightly different curriculum requirements for their junior and senior years.

Freshman Year (Navy and Marines)

NAV S 101 Fundamentals of Naval Science

Fall. No credit.

This course involves a study of fundamental aspects of naval science, this includes contributions to sea power, different warfare communities involved in the physical development of naval forces, and study of resource management and naval science prospects for the future. Naval uniforms, customs, and traditions are also covered.

NAV S 102 Sea Power and Maritime Affairs

Spring. 3 credits.

Discussions examine the history of the Navy as a force in diplomacy and an instrument of U.S. foreign policy. Relationships between Congress and the military for determining the national defense policy are also explored. An integrated examination of current events and issues lends historical perspective throughout the course.

NAV S 157 Principles of Sailing

Fall and spring. Physical education credit.

This is a course of instruction in basic sailing skills and safety principles. Students sail small boats on Cayuga Lake. Focus is on U.S. Navy Class B inshore skipper certifications.

Sophomore Year (Navy and Marines)

NAV S 201 Organizational Behavior and Small Group Processes

Fall. 3 credits.

The theme of the course is the "evolving role of the manager, organizational decision maker, and leader." The course begins by briefly covering the theoretical principles of management and progresses through practical skills used by managers and leaders. Lectures, reading assignments, films, and discussions provide students with an excellent opportunity to consider complex managerial and leadership issues. The goal of this course is for students to begin to develop a sound personal leadership philosophy that will enable them to more effectively accomplish the assigned responsibilities of leading men and women in today's demanding and high tech naval environment.

NAV S 202 Naval Ship Systems I (also Mechanical and Aerospace Engineering 101)

Spring. 3 credits.

An introduction to primary ship-systems and their interrelationships. Basic principles of thermodynamics, propulsion, mechanical operation, internal communications, electronics, ship structure, and other marine systems are covered.

Junior Year (Navy)

NAV S 301 Principles of Navigation (also Agricultural Engineering 305)

Fall. 4 credits.

An introduction to the fundamentals of marine navigation emphasizing piloting and celestial navigation procedures. This course covers coordinate systems, chart projections, navigational aids, instruments, compass observations, time, star identification, use of the nautical almanac, and study of tides and currents. Electronic navigation systems are discussed.

NAV S 302 Naval Operations

Spring. 3 credits.

The course covers the application of the nautical rules and maneuvering board in order to avoid collisions at sea. Other aspects of naval surface ship operations that are introduced include visual and electronic communications methods, tactical disposition of forces, ship handling theory, and deck seamanship topics.

Senior Year (Navy)

NAV S 401 Naval Ships Systems II (Weapons)

Fall. 3 credits.

The principles and theories used in the development of naval weapons systems are examined. Initially, extensive study is made of detection systems, especially radar and sonar, followed by discussions of ancillary systems for computing, stabilizing, tracking, and weapons control and delivery.

NAV S 402 Leadership and Ethics

Spring. 3 credits.

A variety of topics important to the naval officer for both professional and managerial development are reviewed. The material is designed to provide the midshipman with an understanding and appreciation of leadership and ethics in preparation for assignments in the naval service. Through the use of lectures, case studies, and role playing, the student will learn various aspects of naval leadership and ethical decision making. Marine-option students may also take this course.

Junior or Senior Year (Marine Options)

NAV S 310 Evolution of War

Spring. 3 credits.

A study of warfare that examines the relationship of military strategy to geography, economics, sociology, technology, and national political realities. This course includes study of the evolution of warfare, including principles of war, weapons, and associated equipment, and the effects of nuclear weapons and guerrilla warfare on traditional concepts of national strategy.

NAV S 410 History of Amphibious Warfare

Spring. 3 credits.

The history of the development, theory, techniques, and conduct of amphibious operations from 490 B.C. to the present. Special emphasis is placed on amphibious operations conducted in the central Pacific during World War II and on the future of amphibious operations.

Other Required Courses

Navy–Option Scholarship Program

To be eligible for a commission in the United States Navy, midshipmen must successfully complete all the requirements for a baccalaureate degree in any field of study offered by Cornell University, and complete courses in the following subjects (specified courses to be approved by the Professor of Naval Science):

American military affairs or national security policy (one semester)

English (one year)

calculus (one year)

calculus-based physics (one year)

computer science (one semester)

The calculus requirement must be satisfied by the end of the sophomore year and the physics requirement by the end of the junior year.

Although free choice of academic majors is permitted, students are encouraged to pursue majors in engineering and the physical sciences so that they may be best prepared to meet the technological requirements of the modern Navy.

Navy–Option College Program

Navy–option College Program students must complete one year of college-level study in mathematics, physical science, and English as a prerequisite for commissioning. The mathematics course must be completed by the end of the junior year; the physical science course by the end of the senior year. In addition, one term of computer science is required. College Program students who desire entry into the Navy-option Scholarship Program should fulfill all of the requirements applicable to Navy-option scholarship students if they wish to be eligible for a scholarship controlled by the Chief of Naval Education and Training.

Marine Option

Any midshipman, in either the Scholarship Program or the College Program, who completes all of Cornell University's degree requirements in any academic major, is eligible for a commission in the U.S. Marine Corps or U.S. Marine Corps Reserve. Marine-option students take the same naval science courses and naval professional laboratories as Navy-option students for the freshman and sophomore years. During the junior and senior years, Marine-option students have slightly different naval science course requirements than their Navy-option counterparts. Two semesters of courses (a minimum of 3 hours each) in the area of American Military Affairs or National Security Policy are

required. One semester of a modern foreign language must be completed.

Extracurricular Activities

The NROTC midshipman at Cornell is offered a broad range of activities, including sail training and a comprehensive intramural sports program. Midshipmen participate in a myriad of social events, including the annual Navy/Marine Corps Birthday Ball.

DEPARTMENT OF AEROSPACE STUDIES

Colonel James L. Wilson, Jr., United States Air Force, Professor of Aerospace Studies and Commander, Air Force ROTC Detachment 520

Captain April L. Murawsky, United States Air Force

Captain Michael Mowry, United States Air Force

The objective of the Air Force Officer Education Program at Cornell is to prepare men and women for positions as officers in the United States Air Force. The program is designed to teach students about the mission and organization of the Air Force, the historical development of airpower, leadership, and management. Students study national security policy and the role of the military in a democratic society. This program includes specific courses in aerospace studies and practical leadership laboratories.

Requirements for Enrollment

The Air Force Officer Education Program is open to any qualified undergraduate or graduate student enrolled in any major field of study. An applicant must be a United States citizen to become a commissioned officer. Noncitizens may enroll and will receive certificates acknowledging completion of the course but cannot receive a commission.

All applicants receive physical examinations at no cost and must meet certain physical requirements to be accepted. Students who are interested in qualifying for flying categories (pilot or navigator) must meet more stringent physical requirements. In addition, students enrolled in the commissioning program must meet specified physical fitness requirements.

Though the program is designed to prepare future Air Force officers, the Department of Aerospace Studies' academic courses are open to all students at Cornell.

Four-Year Program

The Four-Year Program is open to all qualified freshmen. Sophomores may also enter a condensed version of the four-year program in coordination with the AFROTC staff.

Veterans of the U.S. armed forces and students entering Cornell from military schools may receive advanced standing, subject to approval by the Professor of Aerospace Studies.

The Four-Year Program consists of General Military Courses (GMC) and Professional Officer Courses (POC). For scholarship cadets, the first year of the GMC carries no military commitment, and students may withdraw at any time. For nonscholarship cadets, both years of the GMC carry no military commitment, and students may withdraw at any time.

General Military Course

Students in General Military Courses (GMC) take a 1 credit Aerospace Studies course each semester. During the freshman year, the student examines the organization and mission of the United States Air Force and the environment of the Air Force officer. In the sophomore year, the student studies the history and development of American air power. In both years, officership and professionalism within the United States Air Force are emphasized.

Students also spend two hours a week in a leadership laboratory. Leadership laboratories provide cadets with an opportunity to put into practice the skills they have learned in their aerospace studies classes. These laboratories focus on the development of officer qualities through such activities as drill and ceremonies, group leadership problems, confidence-building exercises, and guest lecturers. In addition, all students participate in summer field training for four weeks between their sophomore and junior years.

Professional Officer Course

The Professional Officer Courses (POC) provide a two-year advanced program of instruction. Students who are accepted for the POC must have successfully completed or validated the basic course and must meet academic and physical standards. Each cadet accepted into the POC must sign an agreement to complete the program and accept, if offered, a commission in the United States Air Force upon graduation.

Classroom study in the POC is a 3 credit course each semester. In the junior year, cadets study Air Force leadership and management at the junior officer level. During the senior year, cadets study the elements of national security and the military's role in American society. Leadership laboratory requires two hours a week in the junior and senior years. In leadership laboratory, cadets are exposed to advanced leadership experiences and apply principles of leadership learned in the classroom.

Two-Year Program

The Two-Year Program consists of the last two years (Professional Officer Courses) of the regular Four-Year Program plus a five-week summer training course preceding enrollment.

The Two-Year Program is open to all qualified students with two years of academic study remaining at Cornell (graduate or undergraduate) or at schools supported under a crosstown agreement. Applications are accepted from October through April of the academic year preceding the applicant's planned entry into the program. Selectees are then required to complete a five-week summer training program at government expense.

Scholarships

The Air Force offers three- and four-year scholarships to high school seniors and one-, two- and three-year scholarships to college students. Four-year scholarships are offered on a competitive basis in specified majors to high school seniors. Scholarship information can be obtained from a high school guidance counselor, from Air Force ROTC officers at Cornell (AFROTC phone number is 607–255–4004), from a local Air Force recruiter, or from the Air Force ROTC scholarship section, Maxwell AFB, AL 36112–6106, 334–953–2093, extension 2093. The deadline for submitting a four-year scholarship application is December 1 of the year preceding the academic year in which a student wants to enter the program. Students should apply early.

Scholarships for two and three years. Applications for these scholarships should be made to the Professor of Aerospace Studies during the freshman, sophomore, or junior years of college. All selections are based on the student's major, scores achieved on the Air Force Officer Qualifying Test, the student's overall grade point average, and the recommendation of the Professor of Aerospace Studies. Scholarships include amounts ranging from $3,000 per year to full tuition, fees and books, and provide a $200 monthly nontaxable allowance during the school year. Scholarships do not include the cost of room and board.

Fees

An initial uniform deposit of $50 is required on entry into AFROTC. Prior to commissioning, cadets may purchase uniforms with their deposit or return uniforms and receive their deposit back.

Benefits

All cadets in the advanced program (POC)—whether they are on scholarship or not—receive a $200-a-month, nontaxable subsistence allowance during the academic year. During the four- or five-week summer field training (see below), each cadet receives a pay allowance plus an allowance for travel to and from the field site. Textbooks and supplies required for Department of Aerospace Studies courses are provided.

All cadets are eligible to participate in AFROTC-sponsored field trips made to Air Force bases throughout the country as well as voluntary summer programs for professional development. Scholarship and advanced cadets (POC) are entitled to space-available travel on Air Force aircraft flying within the continental United States.

Field Training

There are two types of field training: a four-week course for cadets in the Four-Year Program and a five-week course for Two-Year Program applicants. Students in these programs normally attend field training between their sophomore and junior years.

Field training is designed to stimulate the development of military leadership skills through meaningful experiences. The curriculum consists of aircraft, aircrew, and survival orientation; junior officer training; physical training; small arms training; a social-actions program; and supplemental training. The five-week training program includes sixty hours of Air Force ROTC academic course work that substitutes for the freshman and sophomore Aerospace Studies courses.

Cadets may also volunteer for one of many Advanced Training Programs. These programs include but are not limited to the Professional Development Program, Air Force Academy Free-Fall Parachute Training, the British Royal Air Force (RAF) Exchange Program, Research and Development Experiences, the Academy Soaring Program, and Army Airborne Training.

Commissioning Obligations

All students who successfully complete the AFROTC advanced program (POC) are awarded a baccalaureate degree, tendered a commission, and enter the Air Force as second lieutenants.

Second lieutenants commissioned in nonflying categories are required to serve on active duty for four years. Pilots are required to serve on active duty for ten years after completing flying training. Navigators and Air Battle Managers serve six years after completing training.

Air Force Careers

The Air Force assigns new officers to a career field based on mission requirements, educational background, and officers' preferences. Students in the engineering-scientific category may be assigned to practice in their specialty in research and development, communications, electronics, aeronautics, astronautics, the biological sciences, computer design and maintenance, meteorology, space, or other engineering and scientific fields. Graduates in the nontechnical category can anticipate assignments in manpower management, information management, logistics, law enforcement and investigation, intelligence, personnel, transportation, accounting and finance, and other career fields.

Any undergraduate major is suitable for those who are qualified and interested in entering the space and missile career fields or in becoming pilots, navigators, or air battle managers. After completion of flying training, personnel are assigned to a specific type of aircraft.

Curriculum

Students in the Four-Year Program are required to take all courses listed below. Students in the Two-Year Program are required to take all of the courses listed for the junior and senior years. There are no prerequisites for any Aerospace Studies courses.

Freshman Year

AIR S 161 The Foundations of the United States Air Force I
Fall. 1 credit.
This is a survey course designed to introduce students to the United States Air Force and Air Force Reserve Officer Training Corps. Featured topics include: mission and organization of the Air Force, officership and professionalism, military customs and courtesies, Air Force officer opportunities, group leadership problems, and an introduction to communication skills. Leadership Laboratory is mandatory for AFROTC cadets and complements this course by providing cadets with followership experiences.

AIR S 162 The Foundations of the United States Air Force II
Spring. 1 credit.
Continuation of AIR S 161.

Sophomore Year

AIR S 211 The Evolution of USAF Air and Space Power I
Fall. 1 credit.
This course is designed to examine general aspects of air and space power through a historical perspective. The course covers a time period from the first balloons and dirigibles to the role of air power in Bosnia–Herzegovina. Historical examples are provided to illustrate the development of Air Force capabilities and functions to demonstrate the evolution of what has become today's USAF air and space power. The course examines several fundamental truths associated with war in the third dimension, and provides students with an understanding of the general element and employment of air and space power from an institutional, doctrinal, and historical perspective. In addition, students will continue to discuss the importance of the Air Force core values.

AIR S 212 The Evolution of USAF Air and Space Power II
Spring. 1 credit.
Continuation of AIR S 211.

Junior Year

AIR S 331 Air Force Leadership Studies I
Fall. 3 credits.
This course is a study of the leadership, quality management fundamentals, professional knowledge, Air Force personnel and evaluation systems, ethics, and communication skills required of an Air Force junior officer. Case studies are used to examine Air Force leadership and management situations; they demonstrate practical applications of the concepts being studied. A mandatory leadership laboratory complements this course, providing advanced leadership experiences in officer-type activities, and giving students the opportunity to apply leadership and management principles of this course.

AIR S 332 Air Force Leadership Studies II
Spring. 3 credits.
Continuation of AIR S 331.

Senior Year

AIR S 401 National Security Affairs/ Preparation for Active Duty I
Fall. 3 credits.
This course is concerned with the national security process, regional studies, advanced leadership ethics, and Air Force doctrine. Other topics include the military as a profession, officership, military justice, civilian control of the military, preparation for active duty, and current issues affecting military professionalism. Continued emphasis is given to refining communication skills. A mandatory leadership laboratory complements this course by providing advanced leadership experiences, giving students the opportunity to apply the leadership and management principles described in this course.

AIR S 402 National Security Affairs/ Preparation for Active Duty II
Spring. 3 credits.
Continuation of AIR S 401.

Leadership Laboratory Courses

All Air Force cadets spend two hours a week throughout the academic year in a leadership laboratory, for which no academic credit is given. Occasionally laboratories are held at times other than the normally scheduled period. All cadets are expected to participate in a formal dinner and to meet minimum physical fitness and weight standards each semester. Leadership lab is open to students qualified to compete for an Air Force commission.

AIR S 141–142 Initial Military Experiences
Introduction to the responsibilities, life, and work of an Air Force officer. Basic knowledge of drill and ceremonies, military courtesies, and the wearing of the uniform. This course includes a field trip to a local military installation.

AIR S 241–242 Intermediate Military Experiences
This course is designed to help students develop skill in giving commands for drill and ceremonies. They are also introduced to the Air Force base environment in which the officer functions. Career areas available based on academic majors are described. Students participate in military drills and ceremonies, and go on a field trip to a local military installation.

AIR S 341–342 Junior Officer Leadership Experiences
Cadets assume leadership responsibilities similar to those of a junior officer. Emphasis is on the importance of applying effective human relations skills in dealing with superiors, peers, and subordinates. Cadets also gain insight into the general structure and progression patterns of selected Air Force officer career fields.

AIR S 441 Advanced Leadership Experiences
Cadets assume command leadership responsibilities to operate a military organization. Cadets apply effective leadership and managerial techniques with individuals and groups, and participate in self-analysis of leadership and managerial abilities.

AIR S 442 Precommissioning Laboratory
Factors that facilitate transition from civilian to military life are reviewed. The need for military security, base services and activities, personal finances, travel regulations, and social obligations are introduced.

DEPARTMENT OF PHYSICAL EDUCATION AND ATHLETICS

ADMINISTRATION

Alan E. Gantert, director

COURSES

The courses and fees described in this catalog are subject to change or cancellation at any time by official action of Cornell University. For current fee information on physical education courses call 255–4286; for outdoor education courses, call 255–6415 (ext. 2).

Enrollment in any course is limited by the space available. Other restrictions are included in the course description. Most courses are coeducational. The specific time and place of class meetings, as well as information about fees, are available at the physical education course registration or may be found on "Bear Access," a package of software for accessing a variety of network services at Cornell. Course fees are billed through the Office of the Bursar.

Additional course offerings may be listed at registration, as the curriculum is frequently reviewed and changed.

Aquatic Courses

Lifeguard Training
Fall and spring. Fee charged. Prerequisite: swimming test consisting of 500 yards, demonstrating 3 strokes, treading water without the use of hands, and retrieving a brick from 7 feet of water. 3 classes a week.
An American Red Cross certification course. Practice and execution of lifeguarding first aid and CPR skills and techniques. Certification is awarded in lifeguarding, first aid, and CPR upon satisfactory completion of the course.

Lifeguard Training Instructor
Spring. Fee charged. Prerequisites: current Red Cross ICT or instructor card, written and skill tests in lifeguarding, first aid, and CPR techniques. Students must not miss first class. 2 classes a week.
American Red Cross lifeguarding instructor and CPR-FPR certifications are awarded upon successful completion.

Scuba, Open-Water
Fall, spring, and summer (6 weeks). Fee charged.
Program includes classroom work, skill training in a pool, and open-water training in Cayuga Lake. P.A.D.I. open water certification awarded upon successful completion.

Scuba, Advanced Open-Water
Fall and spring. Fee charged.
Advanced-level open-water training in Cayuga Lake. For those who have completed the open-water course.

Rescue Diver
Fall and spring. Fee charged.
Advanced course for scuba divers. For those who have completed Advanced Open-Water Scuba certification and are interested in learning rescue and safety techniques.

Dive Master
Fall and spring. Fee charged.
Advanced-level scuba course open only to those who have completed the Rescue Diver course. NOTE: This is a long, time-consuming course, which requires the student to be in good physical and swimming shape.

Specialty Scuba Diving
Fall and spring. Fee charged.
Courses offered in the following specialty diving areas: navigation, search and recovery, night diving, deep diving, underwater photography, wreck, multi-level, boat, tropical fish identification and buoyancy control, and underwater naturalist.

Scuba Diving Trips
Spring. Fee charged.
This course is offered during the spring intersession period. Scuba trips to various destinations such as the Bahamas. Locations change from year to year. See the information sheet at the registration table.

Swimming, Introduction to (ARC)
Fall, spring, and summer. (6 weeks).
Instruction and practice in skills leading to passing the basic swimming proficiency test.

Swimming, Advanced Beginning (ARC)
Spring.
Ideal for all who have taken one term of Beginning Swimming, regardless of whether the test was successfully completed. Areas of special emphasis are the crawl stroke and rotary breathing, back crawl, elementary backstroke, diving, treading water, and underwater swimming. The primary objective is to strengthen the student's confidence and competence.

Swimming, Intermediate (ARC)
Fall and spring.
Practice of basic skills and five basic strokes; front crawl, back crawl, elementary backstroke, breaststroke, sidestroke.

Swimming, Advanced (ARC)
Fall and spring.
Practice of nine strokes: front crawl, back crawl, elementary backstroke, breaststroke, inverted breaststroke, sidestroke, overarm sidestroke, trudgeon, and butterfly.

Swimming Conditioning
Fall and spring. Prerequisite: reasonable swimming ability.
Introduction to, and practice of, different training methods. Final objective: to swim 2,500 yards during class period. Primarily a conditioning and not an instructional course.

Water Safety Instructor
Spring. Fee charged. Prerequisite: passing of written and skill water tests which are given on the first day.
American Red Cross water safety instructor certification is awarded upon satisfactory completion of the course. This is not a course for a casual participant. Approximately 45 hours of work is required.

Bowling Courses

Bowling
Fall and spring. Fee charged.
For the beginning and intermediate bowler. Shoe rental is included in the fee.

Dance Courses

Develop flexibility, coordination, and the ability to perceive and reproduce phrases of dance movement with rhythmic accuracy, clarity of body design, and fullness of feeling. Auditions are required for admission to all advanced courses, since they require the mental and physical ability to perform more-complex phrases in various styles.

Ballet I
Fall and spring.

Ballet II
Fall and spring.

Ballet III
Fall and spring.

Ballet IV
Fall and spring.

Ballroom Dancing
Fall, spring and summer. Fee charged. One class a week, Helen Newman Hall.
Students and their partners must sign up at course registration.
Includes instruction in the waltz, swing, cha cha, calypso, tango, and others.

Belly Dancing I
Fall and spring. Fee charged.
Belly dancing is an exciting Middle Eastern folk art that can help in the development of flexibility, body awareness, and overall body tone. The class will begin with warm-ups and continue with basic movements and rhythms, then put them together in a dance to music of the Middle East.

Belly Dancing II
Spring. Fee charged.
Advanced Belly Dance movements and combinations which include putting basic and advanced movements to the Beledi, Masmouodi, and Karsilma dance rhythms of the Middle East. A drum solo, taqsim (fluid, graceful movements of the arms and hands), floor work (level changes with the dance), and how to play finger cymbals are also a part of this class.

Introduction to Swing Dance
Fall and spring. Fee charged.
No partners are needed. Beginners can expect to develop significant capacity for enjoyment of two forms of swing dance: jitterbug and street boogie. Partners will be rotated throughout the course. Effort will be made at registration to equalize male and female ratios.

Swing Dance II
Fall and spring. Fee charged.
A class for those who have taken the introductory course.

Latin Dance
Fall and spring. Fee charged.
Partner sign-in required. This is an introductory course that will teach salsa, mambo, Latin and meringue. Emphasis on listening, feeling, and expressing Latin rhythms with precise detail and technique.

Modern Dance I (also THETR 124)
Fall and spring.

Modern Dance II (also THETR 232)
Fall, spring, and summer (6 weeks).

Modern Dance III (also THETR 306)
Fall and spring.

Modern Dance IV (also THETR 308)
Spring.

Equitation Courses

Basic, Intermediate, Advanced
Fall, spring, and summer (6 weeks). Fee charged.
All riding classes are held at the Cornell Equestrian Center located on Pine Tree Road near East Hill Plaza. Detailed information will be offered by the equitation staff at the registration sign-up table. Basic—never ridden; Intermediate I—completed basic with knowledge of walk/trot/canter; Intermediate II—walk/trot/canter with control over 2' course; Advanced—strong jumping/dressage skills with experience hunting/showing/eventing. Students must fill out a release form to participate in any riding class.

First Aid/CPR Courses

Emergency Response
Fall and spring. Fee charged.
This advanced-level first aid course is the most comprehensive available without NYS certification. Sixty hours of training includes CPR for the Professional Rescuer and oxygen administration, as well as many of the first aid skills taught in a basic EMT class. American Red Cross certification is valid throughout the United States and is accepted by many states as a Certified First Responder equivalent. Certification is valid for three years. This certification would be appropriate for camp medical directors and those who work closely with pre-hospital medical staff.

NYS Emergency Medical Technician—Basic
Two-semester course. Fee charged.
This intensive 130-hour course is taught throughout both the fall and spring semesters. Course includes training in CPR for the Professional Rescuer, oxygen administration, airway management, fracture management, bleeding control, expanded patient assessment, spinal immobilization, medical anti-shock trousers, and defibrillation. Students will qualify for the NYS EMT Certification Exam upon successful completion of this course. Rigid attendance and participation requirements are strictly enforced.

NYS Emergency Medical Technician—Intermediate
Two-semester course. Fee charged.
A class for those who are certified as a Basic Emergency Medical Technician.

Fishing Courses

Fly Fishing and Basic Flytying Techniques, Level I
Fall and spring. Fee charged.
Learn the art of tying several of your own artificial flies while you learn the art of fly casting. Students must have a valid NYS fishing license and their own wader boots. All other materials provided.

Introduction to Freshwater Angling
Fall. Fee charged.
This course acquaints the student with freshwater spinning, casting and fly fishing equipment, tackle, and techniques through on-the-water experiences. It also seeks to promote an awareness of the angling opportunities that exist close to Cornell and in the Finger Lakes region of New York. The class consists of an orientation and outings to various locations around the area such as Cayuga Lake and the Susquehana River.

Fitness Courses

Aerobic Dance
Fall, spring, and summer (6 weeks). Fee charged.
A dance program designed to keep the cardiovascular system in top shape by making the body demand increased amounts of oxygen.

Body Sculpting
Fall and spring. Fee charged.

Cardio Crazy
Fall and spring. Fee charged.
The course is designed to acquaint the student with the various types of indoor aerobic training equipment, rowing machines, tread mills, stair machines, exercycles, and Nordic Traks, and to teach them to design a personal fitness program incorporating the equipment.

8 O'Clock Rock
Fall and spring. Fee charged.
This class combines the best of the principles of weight training and the cardio training in the 8 O'Clock Rock Class.

Aerobic Instructor Training
Fall and spring. Fee charged.
The course is designed to train the student to teach aerobics and prepare for the A.F.A.A. Primary Aerobic Instructors Certification Test.

Fitness and Conditioning
Fall and spring.
Physical fitness program that embodies features of stretching exercises, weight lifting, and jogging. Students work on their individual training needs.

Jogging
Fall and spring.
This course will cover running and stretching techniques. A conditioning program with the objective to develop the capacity to run three miles after 12 weeks of training.

Jogging Tours—Distance Running
Fall and spring.
A course designed for the intermediate runner who can run an average of 3 miles in 30 minutes. Most tours will be 3–4 miles long and will go through campus and nearby countryside.

Triathlon
Fall and spring.
Designed to acquaint students with the components of, and conditioning for, triathlon (running, swimming, and bicycling).

Wellness and Fitness
Fall and spring. Fee charged.
"Here's to a Healthier You"—a wellness experience for the busy student. This course will assess the student's physical fitness status, blood cholesterol levels, and overall lifestyle health habits. Each student will receive an individual exercise prescription and have access to the Wellness Program fitness room in Helen Newman Hall. Lectures on nutrition and stress management are also presented. This course has been made possible through the generosity of the Bateman family in memory of Ms. Dorothy Bateman, Cornell's first director of women's sports and physical education (1920 to 1962).

Golf Courses

Golf, Introduction to
Fall and spring. Fee charged.
A PGA program of instruction is geared to all levels of experience and ability. The objective is to give beginners enough skill to play, and to give more-advanced players direction in their thinking, practice, and play, through a thorough understanding of fundamentals. Equipment is furnished.

Golf, Recreational
Fall and spring. Limited to students who are experienced golfers. Fee charged.
Students must provide their own clubs. A minimum of ten rounds of nine holes each must be played to receive credit. Fee covers a semester's membership.

Gymnastics Courses

Gymnastics, Introduction to
Fall and spring.
Introduction to gymnastics deals with a majority of the Olympic events. The course will focus upon beginner-level skills and is open to both male and female participants.

Ice Skating Courses

Skating, Introduction to
Fall and spring. For beginning to intermediate skaters. Fee charged.
Students provide their own skates or rent them at Lynah Rink. Course will cover forward and backward skating, turns, and stops.

Figure Skating, Beginning, Intermediate, and Advanced Levels
Fall and spring. Fee charged.
Instruction and practice in basic figure skating techniques: forward, backward, crossovers, turns, and spirals. Students provide their own skates or rent them at Lynah Rink.

Martial Arts—Self-Defense Courses

Boxing, Introduction to
Fall and spring. Fee charged.
The course covers the basic skills of footwork, defensive, and offensive techniques. Skipping rope, shadow boxing, and heavy bag work will be taught as methods for individual aerobic conditioning.

Boxing, Thai
Fall and spring. Fee charged.
A martial art system developed from the unique culture of Thailand is a blend of art, science, and sport.

Fencing, Introduction to
Fall and spring. Fee charged.
Includes warm-up exercises and offensive and defensive moves. Equipment furnished.

Fencing, Intermediate
Spring. Fee charged. Prerequisite: Introduction to Fencing or the equivalent.
Interclass competition is stressed. Equipment is furnished.

Fencing, Classical
Fall and spring. Fee charged.
Classical fencing is a martial art that uses the practice of the sword to cultivate self-mastery.

Renaissance Fencing
Fall and spring. Prerequisite: Fencing I or with the permission of the instructor. Fee charged.
Focuses on the fundamental techniques of 16th-17th century fencing with an emphasis on safety, balance, line, focus, and distance.

Judo, Introduction to
Fall and spring. Fee charged.
Conditions and increases suppleness.
Continue to develop skills in the two parts of judo: standing techniques (throws and trips) and mat techniques.

Judo, Intermediate
Fall and spring. Fee charged.
Conditions and increases suppleness.
Continue to develop skills in the two parts of

judo: standing techniques (throws and trips) and mat techniques.

Karate, Introduction to
Fall and spring. Fee charged.
A beginning course taught by professional black belt instructors. Involves mastery of basic blocks, kicks, and punches.

Karate, Advanced
Fall and spring. Fee charged.
Open to those who have taken basic Karate or the equivalent.

Kung Fu
Fall and spring. Fee charged.
Exploration of conditioning and fitness procedures used in the major martial arts, such as karate or judo. Covers circular movement for generating strong blocks, kicks, and punches.

Self-Defense and Empowerment for Women
Fall and spring. Fee charged.
Basic methods of physical protection for women.

Tae Kwon Do, Introduction to
Fall and spring. Fee charged.
A Korean martial art distinguished by emphasis on high and powerful kicks. Basic kicking, punching, and blocking emphasized.

Tae Kwon Do, Intermediate
Fall and spring. Fee charged.
A Korean martial art distinguished by its emphasis on high and powerful kicks. Intermediate-level kicking, punching, and blocking are emphasized.

Tae Kwon Do, Advanced
Fall and spring. Fee charged.
A Korean martial art distinguished by its emphasis on high and powerful kicks. Advanced-level kicking, punching, and blocking are emphasized.

T'ai Chi Chuan, Introduction to, and Intermediate
Fall and spring. Fee charged.
Introduction to T'ai Chi, a system of graceful exercises that aim at nurturing relaxation, deep breathing, and improved circulation.

Outdoor Education Program

See the brochure for the Cornell University Outdoor Education Program at registration for more information about courses.

Climbing Courses

Basic Rock-Climbing
Fall, spring, and summer. Fee charged.
Seven afternoons climbing inside on the Lindseth climbing wall.

Basic Rock-Climbing, for Women
Fall, spring. Fee charged.
Seven afternoons climbing inside on the Lindseth climbing wall taught by and for women.

Basic Rock-Climbing, for 24 and Over
Fall, spring. Fee charged. Non-credit course.
Four evenings climbing indoors on the Lindseth wall for people age 25 or older.

High Adventure 101
Fall, spring, and summer. Fee charged.
Six afternoons at local parks and wilderness areas, some classes on indoor Lindseth climbing wall.

Continuing Rock-Climbing
Fall, spring. Fee charged.
Seven afternoons of advanced climbing techniques on the Lindseth climbing wall.

Ice Climbing
Spring. Fee charged.
Four outings to local state parks and gorges.

Outdoor Top Roping
Fall, spring. Fee charged.
Two outings (nights) on the Lindseth climbing wall and two outings at local climbing areas.

Shawangunks Rock-Climbing
Fall, spring. Fee charged.
Four-day climbing camp at the Shawangunks.

Backpacking Courses

Natural History of the Finger Lakes
Fall, spring. Fee charged.
Backpacking skills with a strong environmental focus.

Backpacking in the Finger Lakes
Fall, spring. Fee charged.
Classes lead to two full weekends on the trail.

Southwest Backpacking
Spring. Fee charged.
Spring break trip to the SW deserts and canyons.

Trail Maintenance
Fall, spring. Fee charged.
Work with the local trails club to support and maintain trail systems.

Wilderness Skills
Fall, spring. Fee charged.
Break trip focusing on wilderness travel and living skills.

Wilderness Survival Skills
Fall, spring. Fee charged.
Primitive living skills taught in three classes and a weekend backpack trip.

Biking Courses

Bike and Hike
Fall, spring. Fee charged.
Four full days exploring local countryside.

Bike Repair, Beginning
Fall, spring. Fee charged. Non-credit.
Two evenings of hands-on repair work.

Bike Repair, Intermediate
Fall, spring. Fee charged. Non-credit.
One evening of hands-on repair work.

Mountain Biking
Fall. Fee charged.
Four full days exploring local countryside.

Canoeing Courses

Canoeing, Adirondacks
Fall. Fee charged.
Break trip explores the beauty of the Adirondacks via canoe.

Introduction to Paddling
Fall, spring. Fee charged.
A sampler of beginning canoeing and kayaking.

Canoe/Camping, Flatwater
Fall, spring. Fee charged.
Four full days paddling local waterways including an overnight.

Canoeing, Moving Water
Fall, spring. Fee charged.
Includes a full weekend of river paddling.

Caving Courses

Caving
Fall, spring. Fee charged.
Four days in the fall and two weekends in the spring in Pennsylvania caves.

Hiking Courses

Day Hiking
Fall, spring. Fee charged.
Day outings in the Finger Lakes Region.

Snowshoeing
Spring. Fee charged.
Day outings in the Finger Lakes Region.

Kayaking Courses

Whitewater Kayaking Day Trip
Spring. Fee charged. Non-credit course.
Day excursion for paddlers with basic skills.

Whitewater Kayaking
Fall, spring. Fee charged.
Includes a full weekend of whitewater paddling.

Pool Kayaking
Fall, spring. Fee charged.
Seven-session introduction to whitewater kayaking skills.

Sea Kayaking
Fall, spring. Fee charged.
Break trip exploring various coastal areas.

Outdoor Leadership

Wyoming Expedition
Summer. Fee charged.
Twenty-one day leadership and mountaineering expedition to the Wind River Mountains.

Outdoor Leadership
Spring. Fee charged.
Training course for outdoor education instructors.

Wilderness Emergency Care, Basic
Fall, spring, summer (6 weeks). Fee charged.
Full weekend of wilderness first aid and CPR.

Wilderness Emergency Care, Advanced
Fall, spring. Fee charged. Non-credit.
Two evenings of specialized wilderness care.

Wilderness First Responder
Offered in January, over winter break. Fee charged.
Ten days of instruction and practical application of backcountry first aid. Participants earn CPR and First Responder certifications. Taught by SOLO Wilderness Medical Institute.

Skiing—Cross-Country Courses

Cross-Country Skiing, Basic
Spring. Fee charged.

Cross-Country Skiing, Intermediate
Spring. Fee charged.

Cross-Country Ski Day Touring
Spring. Fee charged.
Four full-day weekend outings. Emphasis on backwoods touring.

Telemark Skiing
Spring. Fee charged.
Four evenings at Song Mountain Ski Area.

Personal Growth Courses

Body-Mind
Fall and spring.
Activities are drawn from ancient Eastern practices as well as modern Western psychology, and are designed to give the student first-hand experience of the interaction between their own bodies and minds.

Introduction to Meditation
Fall and spring. Fee charged.
This course provides the opportunity to explore a variety of ancient and modern methods designed to bring one to the state of meditation. The methods serve to evoke the deep relaxation from which heightened awareness and creativity arise.

Living Routines
Fall and spring.
Provides the opportunity to explore a variety of ancient and modern methods designed to bring one to the state of meditation.

Relaxation and Stress Management
Fall and spring.
Introduction to basic relaxation techniques for the reduction of everyday stress. Techniques will be taught that can be used in normal everyday living situations.

Swedish Massage
Fall, spring, and summer. Fee charged.
Learn to give a relaxing, stress-reducing Swedish massage. You will master the basic strokes of Swedish massage and learn about their application to the different parts of the body. Students will use oils and lotions as a part of their training.

Introduction to Massage
Fall, spring, and summer. Fee charged.
Provides an experiential introduction to several types of massage. Included are Swedish, shiatsu, polarity, and sports massage. Class members will participate in group exercises and practice on each other during class time. All exercises and techniques can be done while wearing street clothing.

Shiatsu Massage
Fall and spring. Fee charged.
Gain an experimental understanding of your body and learn certain shiatsu massage techniques.

Yoga, Introduction to
Fall, spring, and summer (6 weeks). Fee charged.
Fundamentals of hatha-yoga. Covers basic postures, breathing techniques, and deep relaxation. Introduces chanting.

Racquet Sports Courses

Badminton, Introduction to
Fall and spring. Helen Newman Hall.
Fundamental shots, scoring, and general play.

Badminton, Intermediate
Fall and spring. Helen Newman Hall.
Review of fundamental shots, scoring, and general play.

Racquetball, Introduction to
Fall, spring, and summer. Fee charged.
Instruction for beginners. Equipment is furnished. Protective eyewear required.

Squash, Introduction to
Fall, spring, and summer. Fee charged.
Classes for appropriate level of play. Equipment is furnished. Protective eye wear required.

Tennis, Introduction to
Fall, spring, and summer. Fee charged.
Basic skills taught include forehand, backhand, serve, and volley. Scoring methods taught.

Tennis, Intermediate
Fall, spring, and summer. Fee charged.
Review basic strokes plus topspin and underspin. Doubles strategy emphasized.

Tennis, Advanced
Fall, spring. Fee charged.
Advanced strokes and doubles play emphasized. Recommended for tournament players or those with previous team experience.

Tennis, Indoor-Recreational
Fall and spring. Fee charged.
Play is conducted at the new Reis Tennis Center. Players must have high school or college tournament experience or a rating of 3.5 or higher from the USTA. Matches are played in both doubles and singles. Equipment furnished. NO BLACK-SOLE SHOES ALLOWED ON COURTS!

Sailing Courses

Small-Boat Sailing, Introduction to
Fall, spring, and summer (6 weeks). Fee charged.
Learn basic skills necessary to sail small sailboats and basic keelboats safely.

Small-Boat Sailing, Competitive
Fall and spring. Fee charged.
Vanguard 420 sailboat used for the course. USYRA Rules Book used as a text for the course. Fee includes one-year membership in university sailing team program.

Water Skiing
Fall only. Fee charged.
Introductory course for beginning water skiers. Classes will be conducted from East Shore Marina.

Skiing and Snow Boarding

Downhill Skiing and Snowboarding
Spring. Fee charged.
Transportation, instruction, ski-lift fees, and skiing time are offered in a package deal. Greek Peak and Song Mountain personnel are present at registration to explain the program and accept fees. Bus transportation to Greek Peak is provided six afternoons a week for six weeks.

Cross-Country Skiing—See Outdoor Program.

Target Shooting Courses

Archery, Introduction to
Fall and spring. Fee charged. Two classes a week.
Instruction in the care of equipment; seven basic steps for shooting; scoring; practice shooting at 20, 30, and 40 yards.

Pistol, Introduction to
Fall, spring, and summer (6 weeks). Fee charged.
Instruction in use of pistol in the three modes of 50-foot competitive target shooting—slow fire, timed fire, and rapid fire. Emphasis on safety and responsibility while firing.

Riflery
Fall and spring. Fee charged.
Instruction and practice in the techniques of target riflery from various shooting positions.

Trap and Skeet
Fall, spring, and summer (6 weeks). Fee charged.
Includes lectures and shooting at the Tompkins County Rod and Gun Club range. Guns and shells are furnished.

Team Sports Courses

Basketball
Fall and spring.
Fundamental drills in passing, shooting, and dribbling. Scrimmages each class session.

Ice Hockey, Introduction to
Fall and spring. Prerequisite: basic skating ability. Fee charged.
Stick handling, passing, and shooting are stressed. Some scrimaging. Students provide their own skates and sticks; all other equipment is furnished.

Ice Hockey, Intermediate
Fall and spring. Fee charged. Prerequisite: beginning hockey or previous participation in organized hockey.
This course is designed for the intermediate hockey player. Advanced techniques taught include positioning, power play, penalty killing, and offensive and defensive attack. Each session emphasizes game situations and scrimmaging. Skates and hockey sticks must be supplied by the participants.

Soccer
Spring.
Introduction to the game. Includes basic individual skills (passing, trapping, shooting) and team play and strategy.

Volleyball, Introduction to
Fall and spring.
Fundamentals of ball handling, serves, defensive blocks, and position play are stressed. Classes will scrimmage.

Volleyball, Intermediate
Fall and spring.
Passing and blocking strategy; scrimmages in class.

Volleyball, Advanced
Fall and spring.
Offensive and defensive team strategy is emphasized in class scrimmages.

Weight Training Courses

Trotter Circuit Training
Fall and spring. Fee charged.
Students will gain a working knowledge of the basic principles of Trotter selectorized weight lifting equipment. Emphasis on principles of weight training, circuit training, intensity training, and program design.

Principles of Weight Training
Fall and spring. Fee charged.
Introduces the proper use of olympic weights for improving physical condition and muscular strength. Instruction with focus on the relation between high-rep light weight lifting, low-rep heavy lifting, and the development of bulk, strength, and endurance.

Independent Study

Independent Study
Fall and spring.
Independent study is designed for those who have difficulty fitting any of the regularly scheduled courses into their academic program. Class activities will be based on personal fitness programs. A term paper is required. Permission to enter this program must be granted by the program director.

SCHOOL OF CONTINUING EDUCATION AND SUMMER SESSIONS

Summer Sessions provides a wide variety of educational opportunities beyond the degree-granting programs of the university. These programs serve virtually all age groups in a great variety of formats and time frames. For information about the following programs write B20 Day Hall, Ithaca, New York 14853–2801; call 255–4987; e-mail cusce@cornell.edu; or fax 255–9697; unless indicated otherwise below. You may also visit us on the web at www.continuingeducation.cornell.edu.

SCHOOL ADMINISTRATION

Glenn C. Altschuler, dean

Stuart M. Blumin, director, Cornell-in-Washington Program

Dane Cruz, interim director, Cornell Interactive Theatre Ensemble

Abby H. Eller, director, Cornell University Summer College

Carol L. Hall, assistant director, finance and administration

Christine Holmes, special programs manager

Ralph Janis, director, Cornell's Adult University

Charles W. Jermy, Jr., associate dean, and director, Cornell University Summer Session

Ann L. Morse, media manager

Cathy M. Pace, registrar

Diane E. Sheridan, director, finance and administration

SPECIAL AND PROFESSIONAL PROGRAMS

Intensive learning experiences are presented year-round both for students and for professionals in many fields. Formats include for-credit courses of one to eight weeks and noncredit weekend and weeklong short courses. Programs can also be designed to respond to the needs and interests of corporations, professional societies, and other groups. These programs take place on the Cornell campus, on site, at other locations worldwide, and via distance learning. For information call 255–7259; e-mail cusp@cornell.edu; fax 255–9697; or visit www.continuingeducation.cornell.edu/SP/.

SUMMER COLLEGE PROGRAMS FOR HIGH SCHOOL STUDENTS

Talented high school sophomores, juniors, and seniors attend regular university courses through Cornell University Summer College and may earn college credit. They also explore academic and career options in noncredit seminars. Students live in residence halls, become familiar with campus life, and attend seminars describing the college admissions process. The program is designed to help ease the transition from high school to college. For information call 255–6203; e-mail summer_college@cornell.edu; fax 255–6665; or visit www.summercollege.cornell.edu.

CORNELL'S ADULT UNIVERSITY

Cornell's Adult University (CAU) offers week-long noncredit courses on campus for adults and families during the summer. During the fall, winter, and spring, there are weekend seminars, week-long domestic programs, and international study tours. Developed and led by distinguished members of the Cornell faculty, all programs are inspired by the belief that learning never ends and that one of the roles of a great university is to provide a bridge between traditional formal education and informal, noncredit study. For information, write Cornell's Adult University, 626B Thurston Avenue, Ithaca, New York 14850–2490; call 255–6260; e-mail cauinfo@cornell.edu; fax 254–4482; or visit www.cau.cornell.edu.

DISTANCE LEARNING

The School of Continuing Education and Summer Sessions offers a range of courses through distance learning. Instructional materials for these courses may be presented on the web, and/or through video tapes, assigned readings, e-mail sessions with course instructors, and CD-ROMs. Students interact with the instructor and other students by phone or e-mail. Courses may be taken from home or elsewhere. Assignments and examinations are completed within a scheduled session, just as in on-campus courses, but students have the option of beginning study prior to the start of the session. For information, visit www.continuingeducation.cornell.edu/DL/.

Distance Learning Course Roster

ABEN 299 Sustainable Development

AM ST 202 Popular Culture in the United States, 1945 to the Present

AN SC 222 Canine Genetics

AN SC 497 Seminars on Inherited Diseases of Companion Animals

COMM 120 Contemporary Mass Communication

COMM 272 Principles of Public Relations and Advertising

COMM 376 Planning Communication Campaigns

COMM 494.3 Professional Internship in Communication

COM S 100 Introduction to Computer Programming

ECON 101 Introductory Microeconomics

EDUC 494 Introduction to Agriculture Education

EDUC 632 Teaching Agriculture, Extension, and Adult Education

GOVT 161 Introduction to Political Philosophy

ILRST 210 Statistical Reasoning I

ILRST 510 Statistical Methods for the Social Sciences I

EXTRAMURAL STUDY

Cornell undergraduate or graduate students whose studies have been interrupted may find it appropriate to resume their studies by taking classes on a part-time basis. Area residents may take courses on a part-time basis by registering as extramural students. Those interested may enroll in almost any course offered in the fall and spring terms if they receive the instructor's written approval. Another offering, the **Visitor's Program**, allows adults to attend classes in many divisions of the university on a space-available basis at a reduced charge. In this program, no credit is given, and no record is kept of attendance or performance. Visitors are required to obtain written permission from the instructor. For information, write to Extramural Study, B20 Day Hall, Ithaca, NY 14853–2801; call 255–4987; e-mail cusce@cornell.edu; fax 255–9697; or visit www.continuingeducation.edu/EXMU/.

WINTER SESSION

Cornell undergraduate and graduate students, as well as employees and area residents, can earn up to four credits between the fall and spring semesters by enrolling in the winter session. This quiet time on campus allows students to enjoy generally smaller classes and to concentrate on intensive study. Winter-session students may enroll in scheduled courses or design individualized study with a faculty member. For information, write to Winter Session, B20 Day Hall, Ithaca, NY 14853–2801; call 255–4987; e-mail cusce@cornell.edu; fax 255–9697; or visit www.wintersession.cornell.edu.

Winter Session Course Roster

AMST 202 Popular Culture in the U.S. from 1945 to the Present **DL**

AN SC 497 Seminars on Inherited Diseases of Companion Animals **DL**

ASIAN 299 Buddhism

AS&RC 131 Swahili

C&RP 495.18 Introduction to Peace Science

COMM 272 Principles of Public Relations and Advertising **DL**

EAS 106 Vertebrate Fossil Collection and Preparation Techniques

ECON 101 Introductory Microeconomics **DL**

ECON 102 Introductory Macroeconomics

ECON 307 Introduction to Peace Science

ENGL 257/MUSIC 257/THETR 257 American Musical Theatre in New York

ENGL 280 Creative Writing

GOVT 161 Introduction to Political Philosophy

HE 402 Supervised Fieldwork in Urban Affairs

RELST 290 Buddhism

Practicing Medicine/Providing Health Care

CONTINUING EDUCATION INFORMATION SERVICE

This service provides free information, counseling, and referral to adults who have been out of school for several years and want to resume their education. It also provides information about short courses, workshops, professional updates, and executive programs offered by the university to people inside and outside Cornell. For information, write to Continuing Education, B20 Day Hall, Ithaca, NY 14853–2801; call 255–4987; e-mail cusce@cornell.edu; or fax 255–9697.

CORNELL-IN-WASHINGTON PROGRAM

Cornell-in-Washington offers undergraduates the opportunity to combine the strengths of Cornell with all of the best parts of living and learning in Washington, D.C. Students take courses for credit, work as externs, and complete substantial research projects, all the while enjoying the rich opportunities available in the nation's capital.

CORNELL INTERACTIVE THEATRE ENSEMBLE (CITE)

The Cornell Interactive Theatre Ensemble (CITE) is a unique resource for human relations training both on and off campus, serving a wide variety of client groups including university staff, faculty, administrators and students, professional conferences, corporations, and other organizations. Using the medium of interactive theatre, CITE training workshops explore how people can work together effectively and appropriately in a workplace characterized by differences.

CORNELL UNIVERSITY SUMMER SESSION

The Cornell University Summer Session provides unique and unusually attractive opportunities for study and recreation at a time when the Cornell campus and the Finger Lakes region of central New York are at their loveliest and the Ithaca weather is at its best. Participants may choose from a wide spectrum of courses scheduled during three-, six-, and eight-week sessions. Although admission is open to persons of all ages, the majority of summer session participants are matriculated Cornell students. Classes meet daily, are generally small, and feature personalized interaction with Cornell faculty members. These courses also provide students with the opportunity to accelerate their degree program, take courses not available during the fall and spring semesters, and delve into areas of special interest. For information call 255–4987; e-mail cusce@cornell.edu; or visit our web site at www.summer.cornell.edu.

Summer Session Course Roster

The Cornell University Summer Session offers a wide variety of courses. The list that follows includes those courses that are usually offered every summer. The list is not exhaustive; many new courses or courses offered only occasionally are not listed. For complete information, contact the Summer Session Office. Courses are posted to the web (www.summer.cornell.edu) in the fall as the roster is developed. A preliminary course roster is available beginning in late November. If a course is also offered through distance learning, the course title will be followed by **DL**.

Africana Studies

AS&RC 205 African Cultures and Civilizations

SWAHL 131–132 Swahili

Agricultural and Biological Engineering

ABEN 299 Sustainable Development

American Studies

AM ST 101–102 Introduction to American Studies **DL**

AM ST 104 Introduction to American History

AM ST 124 Democracy and Its Discontents: Political Traditions in the United States

AM ST 202 Popular Culture in the United States, 1945 to the Present **DL**

AM ST 301 America's Changing Faces: A New Generation of Political, Economic, and Cultural Leadership

AM ST 341 Recent American History, 1960 to the Present

Animal Science

AN SC 222 Canine Genetics **DL**

AN SC 497 Seminars on Inherited Diseases of Companion Animals **DL**

Anthropology

ANTHR 100 Introduction to Archaeology

ANTHR 101–102 Introduction to Anthropology

Applied Economics and Management

AEM 210 Introductory Statistics

AEM 220 Introduction to Business Management

AEM 221 Financial Accounting

AEM 320 Business Law I

AEM 324 Financial Management

Archaeology

ARKEO 100 Introduction to Archaeology

Other field study opportunities are usually available through this department.

Architecture

ARCH 110 Introduction to Architecture: Design Studio

ARCH 130 Introduction to Architecture: Lecture Series

ARCH 251 Photography I

ARCH 351 Photography II

Consult the Department of Architecture office for a complete list of summer design offerings including foreign study opportunities.

Art

ART 121 Introductory Painting

ART 141 Introductory Sculpture

ART 159 Life and Still-Life Drawing

ART 161 Photography I

ART 168 Black-and-White Photography

ART 169 Color Photography

ART 171–172 Electronic Imaging in Art

ART 221 Painting II

ART 241 Sculpture II

ART 261 Photography II

ART 263 Color Photography

ART 361 Photography III

ART 372 Special Topics in Studio Art

Asian Studies

Chinese

CHIN 160 Introductory Intensive Chinese (Mandarin) [FALCON]

CHIN 201–202 Intermediate Chinese [FALCON]

Japanese

JAPAN 160 Introductory Intensive Japanese

JAPAN 201–202 Intermediate Japanese Conversation

Nepali

NEPAL 101, 201, 203, 301 Intensive Nepali

Sinhala (Sinhalese)

SINHA 160 Intensive Sinhala

Astronomy

ASTRO 105 An Introduction to the Universe

ASTRO 106 Essential Ideas in Relativity and Cosmology

ASTRO 107 An Introduction to the Universe

Biological Sciences

Ecology and Evolutionary Biology

BIOEE 207 Evolution

BIOEE 261 Ecology and the Environment

BIOEE 467 Seminar in the History of Biology: Evolution, Ethics, and Meaning in Life

Microbiology

BIOMI 192 Microorganisms on the Planet Earth

BIOMI 290–291 General Microbiology

Molecular Biology and Genetics

BIO G 200 Special Studies in Biology

BIOGD 281 Genetics

BIOBM 333 Principles of Biochemistry: Proteins, Metabolism, and Molecular Biology

BIOBM 430 Laboratories in Experimental Molecular Biology and Experimental Proteins and Enzymology

BIOBM 602 Molecular Biology for Teachers

Neurobiology and Behavior

BIO G 107–108 General Biology

BIONB 221 Neurobiology and Behavior I: Introduction to Behavior

BIO G 499 Undergraduate Research in Biology

Plant Biology

BIO G 209 Introduction to Natural-Science Illustration

BIOPL 245 Plant Biology

Shoals Marine Laboratory

BIOEE 373 Biology of Marine Invertebrates

BIOSM 160 Oceanography of the Gulf of Maine

BIOSM 204 Biological Illustration

BIOSM 303 Ecology of Marine Fishes

BIOSM 309 Climates and Ecosystems

BIOSM 329 Ecology of Animal Behavior

BIOSM 364 Field Marine Science

BIOSM 365 Underwater Research

BIOSM 366 SEA Introduction to Oceanography

BIOSM 367 SEA Introduction to Maritime Studies

BIOSM 368 SEA Introduction to Nautical Science

BIOSM 372 SEA Practical Oceanography

BIOSM 374 Field Ornithology

BIOSM 375 Field Marine Biology and Ecology

BIOSM 413 Experimental Marine Ecology

BIOSM 418 Tropical Marine Science

BIOSM 449 Seaweeds, Plankton, and Sea Grass: The Ecology and Systematics of Marine Plants

BIOSM 477 Marine Vertebrates

BIOSM 499 Undergraduate Research in Biology

Biology and Society

B&SOC 205 Ethical Issues in Health and Medicine

B&SOC 447 Seminar in the History of Biology: Evolution, Ethics, and Meaning in Life

Biometry and Statistics

BTRY 261/601 Statistical Methods I

Chemistry and Chemical Biology

CHEM 206 Introduction to General Chemistry

CHEM 207–208 General Chemistry

CHEM 251 Introduction to Experimental Organic Chemistry

CHEM 257 Introduction to Organic and Biological Chemistry

CHEM 300 Quantitative Chemistry

CHEM 357–358 Organic Chemistry for the Life Sciences

Classics

Classical Civilization

CLASS 223 The Comic Theater

CLASS 236 Greek Mythology

CLASS 268 A History of Rome from Republic to Principate

Greek

CLASS 104 Intensive Greek

Latin

CLASS 107 Intensive Latin

CLASS 369 Intensive Medieval Latin Reading

Cognitive Studies

COGST 101 Introduction to Cognitive Science

Communication

COMM 116 Communication in Social Relationships

COMM 120 Contemporary Mass Communication **DL**

COMM 201 Oral Communication

COMM 203 Argumentation and Debate

COMM 263 Organizational Writing

COMM 272 Principles of Public Relations and Advertising **DL**

COMM 350 Writing for Magazines

COMM 376 Planning Communication Campaigns

COMM 420 Public Opinion and Social Processes

COMM 494.1 Issues in On-Line Advertising and Marketing

COMM 494.2 Leadership and Communication for Supervisors and Managers

COMM 494.3 Professional Internship in Communication **DL**

COMM 497 Individual Study in Communication

Comparative Literature

COM L 105 The Hero in Literature

COM L 204 Global Fictions

COM L 223 The Comic Theater

COM L 236 Greek Mythology

Computer Science

COM S 099 Fundamental Programming Concepts

COM S 100 Introduction to Computer Programming **DL**

COM S 101 Introduction to Cognitive Science

COM S 130 Creating Web Documents

COM S 211 Computers and Programming

Earth and Atmopsheric Sciences

EAS 101 Introductory Geological Science

EAS 104 The Sea: An Introduction to Oceanography

EAS 213 Marine and Coastal Geology

EAS 417 Geologic Field Mapping in Argentina

EAS 491 Undergraduate Research

Economics

ECON 101 Introductory Microeconomics **DL**

ECON 102 Introductory Macroeconomics

ECON 313 Intermediate Microeconomic Theory

ECON 314 Intermediate Macroeconomic Theory

ECON 362 International Monetary Theory and Policy

Education

EDUC 420 Field Experience

EDUC 494 Introduction to Agriculture Education

EDUC 497 Independent Study

EDUC 507 Science and the Environment for Teachers

EDUC 523 Food and Fiber across the Curriculum

EDUC 548 Effective College Teaching

EDUC 620 Internship in Education

EDUC 632 Teaching Agriculture, Extension, and Adult Education

EDUC 694 Special Topics in Education

EDUC 711 Contemporary Issues in Educational Psychology: Creativity and Problem Solving

EDUC 800 Master's-Level Thesis Research

EDUC 900 Doctoral-Level Thesis Research

Engineering

Distribution Courses

ENGRD 211 Computers and Programming

ENGRD 221 Thermodynamics

ENGRD 270 Basic Engineering Probability and Statistics

The Engineering Cooperative Education Program offers a number of other engineering courses. Contact that office for more information.

English

ENGL 131 Critical Reading and Writing

ENGL 132 The Personal Essay

ENGL 227 Shakespeare

ENGL 288–289 Expository Writing

ENGL 328 The Bible

English as a Second Language

ENGLF 101–102 English as a Second Language

English for Academic Purposes

ENGLF 211 English as a Second Language

ENGLB 215 English for Later Bilinguals

Government

GOVT 111 Introduction to American Government and Politics

GOVT 131 Introduction to Comparative Government and Politics

GOVT 161 Introduction to Political Philosophy **DL**

GOVT 181 Introduction to International Relations

GOVT 307 An Introduction to Public Policy

GOVT 312 America's Changing Faces: A New Generation of Political, Economic, and Cultural Leadership

GOVT 315 Introduction to the American Legal System: Its Nature, Its Sources, and Its Operations

History

HIST 102 Introduction to American History

HIST 124 Democracy and Its Discontents: Political Traditions in the United States

HIST 268 A History of Rome from Republic to Principate

HIST 287 Evolution

HIST 314 History of American Foreign Policy, 1912 to the Present

HIST 340–341 Recent American History

HIST 371 World War II in Europe

HIST 415 Seminar in the History of Biology: Evolution, Ethics, and Meaning in Life

History of Art

ART H 202 Survey of European Art: Renaissance to Modern

Hotel Administration

H ADM 165 Managerial Communication I

H ADM 365 Managerial Communication II

H ADM 450/651 Principles of Real Estate

Human Development

HD 115 Human Development

Human Ecology

HE 406 Fieldwork in Professional Practice: Summer in the City

Industrial and Labor Relations

Collective Bargaining, Labor Law, and Labor History

ILRCB 100 Introduction to U.S. Labor History: Nineteenth Century

ILRCB 201/501 Labor and Employment Law

ILRCB 499 Summer Employment Research

Human Resource Studies

ILRHR 266 Personal Computer Basics

International and Comparative Labor

ILRIC 333/533 Europe, the United State, and Japan in a Changing World Economy

Social Statistics

ILRST 210–211 Statistical Reasoning **DL**

ILRST 510–511 Statistical Methods for the Social Sciences **DL**

Linguistics

LING 170 Introduction to Cognitive Science

Marine Science

Consult related department listings for summer offerings in marine science.

Mathematics

MATH 103 Mathematical Explorations

MATH 105 Finite Mathematics for the Life and Social Sciences

MATH 109 Precalculus Mathematics

MATH 111–112 Calculus

MATH 171 Statistical Theory and Application in the Real World

MATH 191–192 Calculus for Engineers

MATH 221 Linear Algebra and Calculus

MATH 293–294 Engineering Mathematics

MATH 336 Applicable Algebra

Mechanical and Aerospace Engineering

M&AE 221 Thermodynamics

Music

MUSIC 105 Introduction to Music Theory

MUSIC 331 Sage Chapel Choir

Natural Resources

NTRES 306 Coastal and Oceanic Law and Policy

NTRES 309 Sovereign Tribal Environments

NTRES 417 Wetlands Resources

Nutritional Sciences

NS 341 Human Anatomy and Physiology, Lecture and Laboratory

Philosophy

PHIL 101 Introduction to Philosophy

PHIL 145 Contemporary Moral Issues

PHIL 191 Introduction to Cognitive Science

PHIL 231 Introduction to Deductive Logic

Physical Education

Consult the Physical Education Office for a complete list of summer offerings for credit and recreation.

Physics

PHYS 101–102–103 General Physics

PHYS 112 Physics I: Mechanics

PHYS 213 Physics II: Heat/Electromagnetism

PHYS 214 Physics III: Optics, Waves, and Particles

Policy Analysis and Management

PAM 320 Managing the Nonprofit Organization

PAM 380 Human Sexuality

Psychology

PSYCH 101 Introduction to Psychology: The Frontiers of Psychological Inquiry

PSYCH 102 Introduction to Cognitive Science

PSYCH 128 Introduction to Psychology: Personality and Social Behavior

PSYCH 199 Sports Psychology

PSYCH 280 Introduction to Social Psychology

PSYCH 350 Statistics and Research Design

Romance Studies

French Language

FRROM 121 Elementary French

FRROM 203 Intermediate Composition and Conversation

Quechua

QUECH 131–132 Elementary Quechua

QUECH 133–134 Continuing Quechua

Spanish Language

SPANR 121 Elementary Spanish

SPANR 123 Continuing Spanish

Spanish Literature

SPANL 364/664 Culture and Civilization of the Andean World

SPANL 365/665 Contemporary Sociopolitical Issues in the Andes

Russian

RUSSA 121–122 Russian Elementary Course

Science and Technology Studies

S&TS 205 Ethical Issues in Health and Medicine

S&TS 287 Evolution

S&TS 447 Seminar in the History of Biology: Evolution, Ethics, and Meaning In Life

Sociology

SOC 101 Introduction to Sociology

Textiles and Apparel

TXA 114 Introduction to Computer-Aided Design

Theatre, Film and Dance

THETR 223 The Comic Theater

THETR 280 Introduction to Acting

THETR 383 Fundamentals of Screenwriting

Theoretical and Applied Mechanics

T&AM 293–294 Engineering Mathematics

Writing

WRIT 134 An Introduction to Writing in the University

NEW YORK STATE COLLEGE OF VETERINARY MEDICINE

ADMINISTRATION

Donald F. Smith, dean

Robert O. Gilbert, associate dean for clinical programs and professional service

Douglas D. McGregor, associate dean for research and graduate education

Hollis N. Erb, secretary of the college

Katherine M. Edmondson, assistant dean for learning and instruction

Bonita S. Voiland, assistant dean for hospital operations

Gene R. Wheeler, assistant dean for administration

Douglas F. Antczak, director, James A. Baker Institute for Animal Health

Corine Farewell, director of career development

Erla Heyns, head librarian

Mary Beth Jordan, director of human resources

Rodney Page, director, cancer center

Carol S. Peterson, director of financial planning

Joseph A. Piekunka, director of admissions

Kathleen M. Quinlan, director of educational development

Jai Sweet, director of student services and multicultural affairs

DEPARTMENT CHAIRS

Biomedical Sciences: M. Kotlikoff

Clinical Sciences: R. Hackett

Microbiology and Immunology: D. Russell

Molecular Medicine: G. Weiland

Population Medicine and Diagnostic Services: Y. Grohn, acting chair

THE COLLEGE

The College of Veterinary Medicine offers a professional program that requires four years of full-time academic and clinical study of the normal and abnormal structure and function of the animal body and the diagnosis, treatment, and prevention of animal disease.

Graduates of the college receive the Doctor of Veterinary Medicine (D.V.M.) degree, which is recognized by licensing boards throughout the world. Graduates generally enter private practice, academia, or become engaged in one of the increasing number of other biomedical activities.

Admission requires a minimum of three years of college work, including specific prerequisite courses and experience. Applications must be filed approximately one year before the proposed matriculation date. The competition for admission is keen, since there are many more qualified applicants than can be admitted.

Graduate programs in veterinary research and postdoctoral training in clinical specialties are open to Doctors of Veterinary Medicine and some highly qualified holders of baccalaureate degrees and lead to the degree of Master of Science or Doctor of Philosophy.

More detailed information is available electronically at the website of the College of Veterinary Medicine, http://zoo.vet.cornell.edu/.

Note: 500- and 600-level courses are open only to veterinary students except by written permission from the instructor.

The College of Veterinary Medicine has revised its professional curriculum; the new course requirements apply to the class that matriculated in the fall of 1993 and to subsequent classes. Courses in the revised professional curriculum are designated with the prefix "VTMED" and consist of two categories of courses: foundation courses and distribution courses.

The Professional Curriculum

FOUNDATION COURSES

In foundation courses I, II, III, and IV (VTMED 510, 520, 530, 540), students work in small groups under the guidance of a faculty tutor. Case-based exercises are used to facilitate the understanding of basic science concepts within the context of clinical medicine. On average, three to four 2-hour tutorial sessions are scheduled each week. These are complemented by lectures, laboratories, and discussion sessions or other organized learning opportunities specific to the individual course. Faculty are available to respond to questions that arise as a result of the case-based exercises.

Tutorial sessions and all other organized learning programs are usually scheduled during the mornings, thereby reserving the afternoons for independent study. By situating learning in a clinical context, students are better able to integrate material from the basic and clinical sciences and are encouraged to develop an understanding of the clinical reasoning process from the beginning of the curriculum. The tutorial-based educational format creates an atmosphere that requires students to be involved actively in their learning and allows them to develop skills in communication, information retrieval, and analysis.

Note: Courses listed in brackets [ ] are approved courses that are not offered during the 2001–2002 academic year.

VTMED 510 The Animal Body (Foundation Course I)

Fall. 12 credits. Limited to first-year veterinary students. Letter grades only. J. W. Hermanson and staff.

This course is designed to enable students to understand the principles of veterinary anatomy at the gross, microscopic, and ultrastructural levels. Developmental anatomy is emphasized to the extent that it reflects determination of adult form and species differences. Radiologic and related imaging techniques are used throughout the course to assist in the understanding of normal structural anatomy. Understanding of the anatomic basis of common surgical procedures is achieved during the various dissection procedures. The course is based on tutorials with significant emphasis on practical laboratories. Lectures and modules complement student learning.

VTMED 517 Animals, Veterinarians, and Society: Part A (Foundation Course VIIa)

Fall. 1 credit. Limited to first-year veterinary students. Letter grades only. A fee of approximately $10 is charged for the course guide. J. W. Ludders.

This course is the correlate for VTMED 510 The Animal Body. This is a laboratory-based course that teaches physical examination of four species (dog, cat, cow, and horse). The class is divided into small groups and each group meets for two hours each week during the first 11 weeks. The skills of auscultation, percussion, palpation, and observation are taught along with clinically related diagnostic procedures.

VTMED 520 Genetics and Development (Foundation Course II)

Fall and spring. 8 credits. Limited to first-year veterinary students. Prerequisite: VTMED 510 The Animal Body. Letter grades only. R. A. Levine and staff.

An appreciation of how gene expression and cell behavior contribute to normal animal development and health is crucial for our understanding of the pathogenesis of disease. Students gain an understanding of the cellular and molecular mechanisms that regulate development and maintain normal structure and function throughout the life of an animal. Emphasis is placed on defining and characterizing normal cellular behaviors and on understanding how mutations in specific genes promote disease. Students become familiar with the common molecular procedures being used to develop new diagnostic and therapeutic tools to maintain health and combat disease. Tutorial sessions are complemented by lectures, laboratories, and class discussions.

VTMED 521 Neuroanatomy and Clinical Neurology

Spring. 3 credits. Limited to first-year veterinary students. Letter grades only. A. deLahunta.

Fundamentals of functional neuroanatomy and diseases of the nervous system are taught so that each student is competent in the diagnosis of clinical neurologic disorders of domestic animals. This is a vertically integrated course that includes dissection of the central nervous system of the dog, the anatomic basis for the diagnosis of diseases of

the nervous system, and the differential diagnosis of those diseases. Clinical cases with pertinent lesions are demonstrated with each system. Films and videotapes of clinical patients are used to demonstrate the clinical signs produced by the various diseases. Slides of gross and microscopic lesions are used to emphasize the clinical and neuroanatomic relationships and to stress characteristic features of representative conditions.

VTMED 527 Animals, Veterinarians, and Society: Part B (Foundation Course VIIb)

This course begins in the last part of fall semester and finishes at the end of winter session. 1 credit. Limited to first-year veterinary students. Prerequisite: VTMED 517 Animals, Veterinarians, and Society: Part A. Letter grades only. A fee of approximately $7 is charged for the course guide. J. W. Ludders.

This course is the correlate for VTMED 520 Genetics and Development. It enters into a study of ethical issues related to animal use, animal welfare, animal genetics, clinical application of genetics, genetics counseling, and clinical day-to-day ethics. The course meets for one 2-hour session each week.

VTMED 530 Function and Dysfunction: Part I (Foundation Course IIIa)

Spring. 9 credits. Limited to first-year veterinary students. Prerequisite: VTMED 520 Genetics and Development. Letter grades only. R. Rawson and staff.

This course is designed to develop students' understanding of how an animal maintains itself as a functional organism; how this is achieved through the integration of different functional organ systems; how tissue structure relates to tissue function; how injury alters structure and leads to dysfunction, manifested as clinical signs; how organ function can be assessed; and how it can be modulated pharmacologically. The course incorporates aspects of physiology, biochemistry, cell biology, histology, pathology and histopathology, clinical pathology, and pharmacology.

VTMED 531 Function and Dysfunction: Part II (Foundation Course IIIb)

Fall. 7 credits. Limited to second-year veterinary students. Prerequisite: VTMED 530 Function and Dysfunction: Part I. Letter grades only. R. Rawson and staff.

A continuation of VTMED 530 Function and Dysfunction: Part I.

VTMED 537 Animals, Veterinarians, and Society: Part C1 (Foundation Course VIIc)

Spring. 1.5 credits. Limited to first-year veterinary students. Prerequisite: VTMED 527 Animals, Veterinarians, and Society: Part B. Letter grades only. A fee of approximately $9 is charged for the course guide. J. W. Ludders.

This course is the correlate for VTMED 530 Function and Dysfunction: Part I. The central goal of this course is to provide students with the interpersonal skills and techniques necessary to communicate effectively with clients. In addition, students are provided an opportunity to study the human-animal bond, animal death, and grief counseling. This course also provides opportunities to practice client interviewing skills and to participate in a home or farm visit.

VTMED 538 Animals, Veterinarians, and Society: Part C2 (Foundation Course VIIc, continued)

Fall. 1 credit. Limited to second-year veterinary students. Prerequisite: VTMED 537 Animals, Veterinarians, and Society: Part C1. Letter grades only. A fee of approximately $6 is charged for the course guide. J. W. Ludders.

This course is the correlate for VTMED 531 Function and Dysfunction: Part II. This course provides for understanding the importance of the medical record, the diversity of clients, employees, and society in general, and a session on alternative medicine and its various practices. How to critically read and evaluate clinical studies and journal articles is also addressed.

VTMED 540 Host, Agent, and Defense (Foundation Course IV)

Fall. 12 credits. Limited to second-year veterinary students. Prerequisite: VTMED 531 Function and Dysfunction: Part II. Letter grades only. J. Baines (course leader) and others.

This course is divided into six sections: the host response, intracellular environment, extracellular environment, somatic environment, external environment, and surrounding environment. Using this approach, students develop an understanding of the host response to insult, a familiarity with groups of important pathogens, an understanding of how pathogens manipulate the host and how the host defends itself against attacks, and an understanding of the roles played by the external environment and human intervention in the epidemiology of infectious organisms.

VTMED 547 Animals, Veterinarians, and Society: Part D (Foundation Course VIId)

Fall. 1 credit. Limited to second-year veterinary students. Prerequisite: VTMED 538 Animals, Veterinarians, and Society: Part C2. Letter grades only. A fee of approximately $12 is charged for the course guide. J. W. Ludders.

This course is the correlate for VTMED 540 Host, Agent, and Defense. The course emphasizes maintaining health in both individuals and populations of animals and humans. Topics include animal bites, nosocomial infections, rabies control programs, vaccines and vaccine reactions, zoonotic diseases, and integrated health maintenance programs. The course emphasizes veterinary public health.

VTMED 550 Animal Health and Disease: Part I (Foundation Course V)

Spring. 10 credits. Limited to second-year veterinary students. Prerequisite: VTMED 540 Host, Agent, and Defense. Letter grades only. R. Hackett.

This course integrates the clinical sciences of medicine, surgery, anesthesiology, radiology, and theriogenology, which are themselves integrated subjects, with systems pathology and relevant aspects of applied pharmacology. The course is presented on a systems basis moving from clinical signs of alteration in function, to pathophysiology of clinical signs, to strategies for diagnosis and treatment. Specific examples are used to establish a cognitive framework and knowledge of the most important diseases. This course provides a sound foundation for clinical rotations in Foundation Course VI. It builds on the strengths developed in earlier courses by an increased exposure to case examples in a more directed way, taking advantage of the diversity of skills and special knowledge of both faculty and students. A variety of educational techniques are used, including lectures in which interaction is encouraged, laboratories, demonstrations, case discussions, and autotutorials.

VTMED 551 Animal Health and Disease: Part II (Foundation Course V, continued)

Fall. 20 credits. Limited to third-year veterinary students. Prerequisite: VTMED 550 Animal Health and Disease: Part I. Letter grades only. R. Hackett and staff.

A continuation of VTMED 550 Animal Health and Disease: Part I.

VTMED 557 Animals, Veterinarians and Society: Part E (Foundation Course VIIe)

Spring. 1 credit. Limited to second-year veterinary students rolling over into fall semester for the then third-year veterinary students. Prerequisite: VTMED 547 Animals, Veterinarians, and Society: Part D. Letter grade only. A fee of approximately $14 is charged for the course guide. J. W. Ludders.

This course is a correlate with Foundation Course V, Animal Health and Disease. The course examines governmental regulation of the veterinary profession, including proper drug usage, extra label drug use (FDA), controlled substances (DEA), substance abuse, professional liability and malpractice insurance, professional and unprofessional conduct, hazardous materials in the workplace (OSHA), and environmental issues (EPA). Also included are sessions relating to controlling and preventing the spread of animal diseases and the role of USDA and specifically APHIS in these regulatory functions.

VTMED 560 Ambulatory and Production Medicine I

Fall, winter, spring and summer. Credit variable (either one or two credits). Limited to veterinary students. Letter grades only. M. E. White and staff.

A total of 4 weeks of Ambulatory and Production Medicine are required. VTMED 565 is taken during the clinical rotations in the 3rd or 4th year. VTMED 560 is also generally taken during the third or fourth year, however first and second year students are encouraged to take one or two weeks of this course over winter recess or during the summer if slots are available. A lottery is done to assign first or second year students to the available slots. See VTMED 565 for course description.

VTMED 561 Community Practice Service—Medicine

2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. W. E. Hornbuckle and staff.

The Community Practice–Medicine Service is structured to provide supervised clinical experience in the practice of small companion animal medicine. The course is conducted in the Small Animal Clinic of the Cornell University Hospital for Animals. Students interact directly with clients presenting their pet for primary medical care. Under the supervision of the clinical faculty and staff, the students are expected to formulate and carry out plans for the diagnostic evaluation and medical management of these patients. After review, students explain their plans to the clients and provide follow-up care and management of these patients.

VTMED 562 Surgery III
2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. H. J. Harvey and staff.
Basic principles of anesthesiology and surgery are emphasized in the clinical rotation. Under direct staff supervision, students anesthetize and perform surgical procedures on patients presented to the Small Animal Clinic for neutering and minor elective procedures. Students are responsible for all aspects of patient care during their hospital stay and are expected to fully participate in client communications. Ordinarily, this course will precede Anesthesiology Service and Small Animal Surgery Service (soft tissue component).

VTMED 563 Small Animal Medicine
Fall, spring, winter, and summer. 4 credits. Required course open to second-semester third-year and all fourth-year veterinary students; not open to others. Letter grades only. S. C. Barr, S. A. Center, J. F. Randolph, and K. W. Simpson.
The Small Animal Medicine Service is structured to provide supervised clinical experience in the practice of companion small animal medicine. The course is conducted in the Small Animal Clinic of the Cornell University Hospital for Animals. Students interact directly with clients presenting their pets for primary or referral medical care. Under the supervision of the clinical faculty and staff, the students are expected to formulate and carry out plans for the diagnostic evaluation and medical management of these patients.

VTMED 564 Small Animal Surgery Service
Fall, winter, spring, and summer. 4 credits. Required of all third- and fourth-year veterinary students; not open to others. Letter grades only. H. J. Harvey and small animal surgery faculty.
A clinical service rotation, this course exposes the student to the practice of surgery under hospital conditions. Students participate in the diagnostic techniques; planning of therapy; and daily care of dogs, cats, and exotic species under the direction of a faculty veterinarian. Students assist experienced surgeons in the operating room and, with house-officer supervision, are responsible for patients undergoing elective ovariohysterectomy or castration. Client communications and the basics of efficient practice are emphasized.

VTMED 565 Ambulatory and Production Medicine II
Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. M. E. White and staff.
A clinical service rotation in which students accompany ambulatory clinicians on farm and stable calls and learn the skills and procedures necessary for operation of a modern veterinary practice offering primary care to large animal clients. Routine herd health visits are conducted for cattle, horses, sheep, goats, and swine. Reproductive evaluations (including pregnancy and fertility examinations), nutritional evaluation, and disease prevention are stressed. Herd health programs also include vaccinations, parasite control, mastitis prevention, and routine procedures such as castration and dehorning. With appropriate herds, analysis of computerized performance data is conducted and discussed with the owner. In addition to assisting with routine scheduled work, students participate in diagnosis and medical or surgical treatment of ill or injured animals. This includes rotating assignments for night and weekend duty.

VTMED 566 Large Animal Medicine Service
Fall, winter, spring, and summer. 3 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. D. Ainsworth, T. Divers, and staff.
Students assigned to this service assist the faculty and house staff of the Large Animal Medicine service in the diagnosis and care of patients. The goal of this course is for students working on this service to acquire knowledge and skills in history taking, physical examination, election and completion of appropriate ancillary tests, diagnosis, treatment, and patient care. Daily rounds and discussions are used to monitor patient progress and further educate students.

VTMED 567 Large Animal Surgery Service
Fall, winter, spring, and summer. 4 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. A. J. Nixon and staff.
This clinical rotation is structured to provide supervised clinical experience in the practice of large animal surgery. Under the direction of faculty and house staff, students participate in the diagnosis, surgical treatment, and care of patients presented to the Large Animal Clinic. Training through patient care is supplemented by formal rounds and didactic instruction.

VTMED 568 Anesthesiology Service
Fall, winter, spring, and summer. 3 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. R. D. Gleed, J. W. Ludders, P. F. Moon, and staff.
This course is designed to provide clinical experience in the use of anesthetics in small companion animals, horses, and some food animals. The students participate in selecting suitable anesthetic techniques for patients in the Cornell University Hospital for Animals and then implement those techniques under the supervision of faculty and residents. The goal is for students to learn the skills and thought processes necessary to perform safe anesthesia in a modern veterinary practice.

VTMED 569 Dermatology Service
Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. W. H. Miller and D. W. Scott.
During this clinical rotation, students participate in the diagnosis and management of skin disorders in small and large animals. Patients are examined by appointment and through consultation with other hospital services.

VTMED 570 Ophthalmology Service
Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. R. C. Riis, T. Kern, and N. Irby.
This course combines clinical experience with beginning skills in diagnostic ophthalmology. Students learn how to apply the ophthalmic diagnostic tests. A competent ocular examination is the goal of this rotation. Confidence in using direct and indirect ophthalmoscopes, slit lamps, tonometers, goniolenses, conjunctival cytology, and surgery comes with the practice provided by this rotation. Students are required to review the introductory orientation videotapes in the Autotutorial Center titled *Ocular Examination I and II* before the start of the rotation. This rotation provides surgical experience and consultations. A high percentage of the consultations are referral cases that usually challenge the service. Adequate routine case material is presented to prepare most students for practice.

VTMED 571 Pathology Service
Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. B. A. Summers and staff.
This course involves the hands-on diagnostic necropsies of most mammalian species that are presented to the pathology necropsy room and of avian species that are admitted to the avian and aquatic animal medicine necropsy room. Students work in groups of three to five for the two-week rotation. Necropsies are performed under the guidance of pathology faculty and residents. Students prepare written reports of necropsies performed, review microscopic hematology and cytology slides, perform urinalyses, and discuss case studies.

VTMED 572 Radiology Service
Fall, winter, spring, and summer. 2 credits. Required component of Clinical Rotations (Foundation Course VI). Letter grades only. N. L. Dykes and staff.
A two-week clinical experience in the Imaging Section of the Cornell University Hospital for Animals. Students use radiographic, CT, ultrasonographic, and nuclear medicine imaging techniques to evaluate animal patients under treatment in the Hospital. Students obtain and interpret radiographic and ultrasonographic studies with guidance from radiology faculty and technical staff. Two 3-hour laboratory sessions are given to allow hands-on experience in patient positioning and radiographic technique. An autotutorial teaching film file is used to familiarize students with radiographic examples of common diseases of large and small animal species. Small-group discussions are scheduled to present and discuss current cases. The safe use of x-ray–producing equipment and radioisotopes is discussed.

VTMED 573 Fourth-Year Seminar
Fall and spring. 1 credit. Required of all fourth-year veterinary students. First-, second-, and third-year students and all staff members are also invited and encouraged to attend. S-U grades only. F. H. Fox, chair of the Senior Seminar Committee.
The aim of this course is to give the student the responsibility and opportunity of selecting and studying disease entity on the basis of a case or series of cases, or to conduct a short-term, clinically oriented research project under the direction of a faculty member. In either case, an oral report is presented at a weekly seminar. A written report is also submitted at the time of the seminar. All participants are encouraged to foster an atmosphere in which discussion, exchange of ideas, and the airing of controversial opinions might flourish.

DISTRIBUTION COURSES

Distribution courses comprise 30 percent of the curriculum and are usually scheduled during the first half of each spring semester. During the first two years, many of the distribution courses are oriented to the basic sciences. During years three and four, students have additional distribution course offerings from which to choose. Some emphasize clinical specialties, whereas others integrate basic science disciplines with clinical medicine and are co-taught by faculty representing both areas. Students from different classes have the opportunity to take many of these courses together.

Grades: Grading options for distribution courses are either letter or S-U.

VTMED 601 Anatomy of the Carnivore

Spring. 3 credits. Prerequisite: VTMED 510 The Animal Body or permission of instructor. First-, second-, third-, and fourth-year veterinary students; others by permission. Letter grades only. A. J. Bezuidenhout.

Carnivore anatomy is studied by detailed systematic and regional dissection of the cat, with comparison to the dog. Student dissection is supplemented with prosections, radiographs, and exercises focusing on surgical approaches. There are opportunities to dissect other carnivores, such as the ferret and the fox, depending on availability of specimens. The lectures augment the laboratory dissection and introduce the student to functional morphological comparative features in the Order Carnivore. Students do an independent research project on the carnivore species of their choice and give an oral presentation on this to the class.

VTMED 602 Anatomy of the Horse

Spring. 3 credits. Prerequisite: VTMED 510 The Animal Body or permission of instructor. First-, second-, third-, and fourth-year veterinary students; others by permission. Letter grades only. K. Haussler.

This course is organized as a traditional anatomy course that relies primarily on students learning the anatomy of horses through hands-on dissection laboratories augmented by lectures and highlighted by clinical correlations. An understanding of anatomy that provides the foundation for surgery and is directly relevant to clinical practice is emphasized in the regional approach to dissection. Most lectures emphasize structural-functional correlations that are unique or important in the horse. Microscopic anatomy is integrated into the course in selected areas to lay a foundation for the later study of pathology or when it reinforces concepts of structure and function that are difficult to understand by a study of the gross anatomy alone (i.e., hoof). Student dissection cadavers are supplemented by skeletal materials, radiographs, models, preserved predissected specimens, and fresh specimens when they are available.

VTMED 603 Anatomy of the Ruminant

Spring. 3 credits. Prerequisite: VTMED 510 The Animal Body or permission of instructor. First-, second-, third-, and fourth-year veterinary students; others by permission. Letter grades only. J. Hermanson.

The regional anatomy of several ruminant species is covered using dissection laboratories, lectures, and large-group discussions. Functional consequences of structural modifications and anatomical features relevant to clinical practice are emphasized. Microscopic anatomy is correlated with gross anatomy when appropriate to relate structure to function and to provide a foundation for later study in pathology. Student dissection material is supplemented by skeletal materials, radiographs, models, predissected specimens, and postmortem specimens. Students are required to complete an independent study project on a relevant subject of their choice. Assessment includes written and practical examination.

VTMED 605 Comparative Anatomy: Pattern and Function

Spring. 3 credits. Prerequisite: VTMED 510 The Animal Body. First-, second-, third-, or fourth-year veterinary students; others by permission. Letter grades only. L. A. Mizer.

The goal of this course is to study anatomical variability among amniote (mammals, birds, and reptiles) and anomniote (amphibian and fish) species. This is accomplished by relating the anatomy of major organ systems in each species to a common basic pattern and considering the differences in a functional perspective. Five major systems are explored (integumentary, locomotory, cardiorespiratory, digestive, and urogenital) in a variety of species as available.

VTMED 606 Advanced Clinical Neurology

Spring. 1 credit. Prerequisite: VTMED 521 Neuroanatomy and Clinical Neurology. Third- and fourth-year veterinary students. Letter grades only. A. deLahunta.

The objective of this course is to further the experience and confidence of the student in the diagnosis and understanding of clinical neurological disorders. It continues their correlation of anatomy, physiology, and pathology in the diagnosis of diseases of the nervous system and the understanding of their pathogenesis. Neurological disorders that are not covered in the foundation course are considered here. The course is entirely based on case examples that are presented on videotapes and slides.

VTMED 607 The Literature and Subject Matter of Natural History

Spring. 1 credit. First-, second-, third-, and fourth-year veterinary students; others by permission. S-U grades only. H. E. Evans.

This course is an introduction to classic and current natural history literature. Materials relating to the earth sciences and the biology of plants and animals from around the world are shown and discussed. Students are required to show and discuss a book that concerns natural history in a country of their choice, and submit a one-page book report for duplication. A recommended reference text for this course is *The Cambridge Illustrated Dictionary of Natural History* by R. J. Lincoln and G. A. Boxshall, 1990.

VTMED 609 Anatomy and Histology of Fish

Spring. 2 credits. Minimum enrollment 4; maximum enrollment 6. First-, second-, third-, and fourth-year veterinary students, others by written permission of instructor. S-U grades optional. P. R. Bowser.

This course provides an overview of the diversity of anatomy and histology of fish. Students participate in lecture, discussion, and laboratory exercises to review the major organ systems. Extensive use of library resources for assigned readings is expected. Each student prepares a term project and makes one oral presentation.

VTMED 610 Veterinary Aspects of Avian Biology

Spring. 1 credit. Minimum enrollment 10; maximum enrollment 60. First-, second-, third-, and fourth-year veterinary students; others by permission. Letter grades only. Offered even-numbered years. G. V. Kollias.

An introduction to avian biology for veterinary students. The course includes lectures and laboratories involving avian evolution, anatomy, physiology, and ecology. Emphasis is on the development of a strong foundation in avian biology that will be applied in VTMED 616 Diseases of Birds and VTMED 652 Avian Medicine and Surgery.

[VTMED 611 Fish Health Management

Spring. 1 credit. Minimum enrollment 8; maximum enrollment 16. First-, second-, third-, and fourth-year veterinary students; others by written permission of instructor. S-U grades optional. Offered odd-numbered years; next offered spring 2003. P. R. Bowser.

This course presents a summary of important diseases of fin fishes. Diseases covered are those of importance in commercial aquaculture as well as those encountered by the tropical fish hobbyist. The course is designed to provide the students with a knowledge base and hands-on diagnostic experience in diseases of fish. Each student prepares a term project and makes one oral presentation.]

VTMED 612 Management of Aquarium Systems

Spring. 1 credit. Minimum enrollment 8; maximum enrollment 16. First-, second-, third-, and fourth-year veterinary students; others by written permission of instructor. S-U grades optional. Offered even-numbered years. P. R. Bowser.

This is a lecture and laboratory course dealing with procedures and practices involved in management of aquarium systems. Topics include water quality, types of aquarium filtration systems, fish health, fish nutrition, and general fish biology. A portion of the course requires independent work in aquarium system management. Each student prepares a term project and makes one oral presentation.

VTMED 613 Aquavet I: Introduction to Aquatic Veterinary Medicine

Four weeks of full-time instruction at Woods Hole, Massachusetts, immediately after the spring term. 4 credits. Maximum enrollment 24 students from Cornell University, the University of Pennsylvania, and other U.S. colleges and schools of veterinary medicine. Available, by a competitive application process, to veterinary and graduate students. S-U grades only. Course fee required. P. R. Bowser.

The course is sponsored by Cornell University, the University of Pennsylvania, and three marine science institutions at Woods Hole: the Marine Biological Laboratory, Woods Hole Oceanographic Institution, and Northeast Center of the National Marine Fisheries Service. It is designed to introduce veterinary students to aquatic animal medicine. The marine environment is described and visited on field trips in the Woods Hole area. Specific aspects of the comparative anatomy,

physiology, nutrition, microbiology, pathology, and medicine of a variety of marine and freshwater species are discussed. Some emphasis is placed on systems of aquaculture. The specific diseases of a few selected species are presented as examples, including the diseases of a crustacean, a shellfish, a finfish, and marine mammals. The course is taught by an invited faculty of 35 individuals who are leaders in their respective fields of aquatic animal medicine. Students present seminars on appropriate topics.

VTMED 614 Aquavet II: Comparative Pathology of Aquatic Animals

Two weeks of full-time instruction at Woods Hole, Massachusetts, immediately after the spring term. 2 credits. Prerequisites: formal course work in diseases of aquatic animals or appropriate experience and permission of instructor. Maximum enrollment 18. S-U grades optional. Course fee required. Available, by a competitive application process, to veterinary and graduate students. P. R. Bowser.

This course is sponsored by Cornell University, the University of Pennsylvania, and three marine science institutes at Woods Hole: the Marine Biological Laboratory, Woods Hole Oceanographic Institution, and Northeast Center of the National Marine Fisheries Service. It is an advanced course in the comparative pathology of aquatic invertebrates and vertebrates commonly used as laboratory animals. The material presented consists of discussions of the diseases of aquatic animals as well as extensive use of the microscope to examine the histopathology associated with these diseases. The course is taught by an invited faculty of 12 individuals who are leaders in their respective fields of aquatic animal medicine.

[VTMED 615 Veterinary Medicine in Developing Nations

Spring. 2 credits. Maximum enrollment 20. First-, second-, third-, and fourth- year veterinary students; others by permission of instructor. S-U grades only. Offered odd-numbered years; next offered spring 2003. K. A. Schat.

Veterinary medicine has an important role to play in developing nations in developing and providing economical sources of animal proteins for human consumption and protecting ecological resources. This seminar course provides interested veterinary students with information on and insight into the multitude of complex issues facing U.S. veterinarians working in developing nations.]

VTMED 616 Diseases of Birds

Spring. 2 credits. Minimum enrollment 10; maximum enrollment 80. Second-, third-, and fourth-year veterinary students. Letter grades only. S. Naqi and G. V. Kollias.

This course is designed to introduce second-, third-, and fourth-year veterinary students to a basic and practical knowledge of the most common infectious and noninfectious diseases affecting a variety of avian species. The course emphasizes the latest diagnostic and control approaches. The course format is a combination of didactic lectures and discussions.

[VTMED 618 Adaptation of Animals to the Environment

Spring. 1 credit. Minimum enrollment 10. Graduate and first-, second-, third-, and fourth-year veterinary students. Letter grades only. Not offered 2001–2002. Staff.

The course examines the physiological adaptations of animals to their environment in addition to methods of acclimatization to novel environments. The course focuses on environmental parameters that exist in harsh environments and include heat, cold, altitude, and xeric conditions. Thus the physiological mechanisms of thermoregulation in mammals, birds, and ectotherms is examined together with their responses to low food and water availability. The knowledge obtained aids in understanding the consequences of translocation of both wild and domestic animals and provide a rational basis for animal housing and the provision of appropriate habitats for zoological gardens. The degree of environmental adaptation is also examined in terms of animal production from a basic science standpoint.]

[VTMED 619 Pathogenesis of Viral Disease

Spring. 2 credits. Minimum enrollment 15; maximum enrollment 45. Strongly recommended prerequisite of immunology. First-, second-, third-, and fourth-year veterinary students. Letter grades only. Offered odd-numbered years. Next offered spring 2003. J. D. Baines.

Course content and objectives: the course focuses on the balance between host defense against viral infections and the mechanisms by which viruses perpetuate themselves in human and animal populations. In the process, the mechanisms of cell and animal infection, spreading between cells, disease mechanisms, and the roles of the immune response in enhancing and suppressing disease are explored. This includes a systems-based approach exploring the pathogenesis of disease in the CNS, gastrointestinal, hepatic, tegumentary, respiratory, and urogenital systems. The basic principles of virus taxonomy, structure and replication are included to introduce various viral groups and their special properties. Methods of intervention (vaccination, antiviral drugs) are also covered. Lectures are derived from relevant current literature, the text, Nathanson's *Viral Pathogenesis*, 1997, and Field's *Virology*, third edition, 1996. Relevant materials are placed on reserve in the veterinary library.]

VTMED 620 Molecular Biology and Immunology of Host-Parasite Interactions (also VETMI 702)

Spring. 2 credits: First-, second-, third-, and fourth-year veterinary students, others by permission of the instructor. Letter grades only. Offered even-numbered years. E. J. Pearce.

The primary objective of this lecture course is to make the student aware of the most important areas of research in contemporary parasitology. Lectures focus on a broad range of parasites, with an emphasis on those of medical importance. Recently published research articles and reviews are used as the basis from which to explore the issues of host invasion, evasion of host defense mechanisms by parasites, vaccination against parasitic infections, chemotherapy, drug resistance, vector biology, and molecular diagnosis.

VTMED 622 Foreign Infectious Diseases of Animals

Spring. 1 credit. Minimum enrollment 18. Second-, third-, and fourth-year veterinary students. Letter grades only. D. H. Schlafer.

This course describes the etiology, pathogenesis, clinical signs, gross pathology, differential diagnosis, methods of spread, reservoir hosts, and control of foreign animal diseases that present serious economic threats to the United States. The format is student seminar presentations with each student responsible for presenting one seminar. The recent spread of FMD, West Nile and BSE emphasize the importance these diseases have to producers, consumers, and practicing veterinarians. Ordinarily the course also includes presentations by college faculty and research scientists working on foreign infectious diseases.

VTMED 624 Feline Infectious Diseases

Spring. 1 credit. Minimum enrollment 10; maximum enrollment 80. Second-, third- and, fourth-year veterinary students. Letter grades only. S. C. Barr.

The course consists of two 50-minute lecture periods a week for eight weeks. The letter grade is obtained entirely from the result of a written examination (usually multiple choice format) given in the final period. The course emphasizes the clinical aspects of feline infectious diseases common to cats in North America and complements knowledge acquired in Blocks IV and V. The overall objective is to provide details about specific infectious diseases a future small animal practitioner may need to know to effectively diagnose and treat diseases. Etiology, epidemiology (prevalence and transmission), pathogenesis, clinical findings, diagnosis, pathologic findings, therapy prevention, and public health considerations are emphasized. Most lectures are presented from a clinician's point of view and therefore the material is oriented towards practical skills in managing clinical cases.

VTMED 625 Osteoarthritis

Spring. 1 credit. Maximum enrollment 16. Graduate and second-, third-, and fourth-year veterinary students. Letter grades only. G. Lust.

This course provides a basis at the molecular, cellular, and tissue levels for understanding the function of mammalian diarthrodial joints. It includes a description of a diarthrodial joint and the composition and metabolism of articular cartilage, subchondral bone, ligaments, meniscus, capsule, and synovium. The interrelationships of synovium, synovial fluid, articular cartilage, joint lubrication, biomechanical considerations, and enervation are considered. Canine hip dysplasia is a focus during the early class sessions. The osteoarthritis that is associated with canine hip dysplasia serves as a basis for discussion of the etiopathogenesis of the disease. Canine osteoarthritis is emphasized, but the disease in animal models such as mice, guinea pigs, rabbits, and sheep is mentioned. Therapies, such as nonsteroidal anti-inflammatory drugs, glucocorticoids, and others may be discussed.

VTMED 626 Epidemiology of Infectious Diseases

Spring. 1 credit. Maximum enrollment 8. Second-, third-, and fourth-year veterinary students. Letter grades only. H. Mohammed and staff.

This course introduces the epidemiologic methods used in infectious disease investigations. The importance of surveillance systems in detecting modern epidemics and in the development of effective disease prevention and control strategies are also discussed. An emphasis is placed on understanding the relationships between the host, the agent, and the environment as they relate to disease causation. The course explores contemporary epidemiologic methods applicable to old diseases that remain real or potential

problems, newly emerging infectious diseases, and nosocomial infections. Selected diseases are discussed to clarify the role of epidemiology in understanding the pathogenesis of infectious processes in individuals and groups of animals. Students have the opportunity to apply the methods learned to actual disease problems and write an epidemiologic report that might lead to a publication in a peer-reviewed scientific journal.

[VTMED 627 Diseases of Antiquity
Spring. 1 credit. Second-, third-, and fourth-year veterinary students. Letter grades only. Not offered 2002. Staff.
This is a study of 36 human and animal diseases that have had profound effects on the course of human history from the beginning of recorded time to the present. This course combines aspects of literature, medicine, and history and explores the interactions between demographics, commerce, imperialism, medical care, the environment, and disease. Prevailing superstitions and religious views are considered in context with each illness and simultaneously occurring world events.]

[VTMED 628 Clinical Pathology
Spring. 2 credits. Minimum enrollment 20; maximum enrollment 60. Second-, third-, and fourth-year veterinary students. Letter grades only. Not offered 2002. Staff.
This six-week course addresses a range of issues related to laboratory medicine and interpretation of laboratory results. General topic areas include hematology, clinical chemistry and immunology, and urinalysis. The primary mode of instruction is student-driven small-group (untutored) exploration of case materials followed by faculty-moderated large-group discussions. Selected lectures and laboratory sessions supplement and expand on issues generated by the case discussions. This course builds on concepts previously addressed in Block III and IV and also provides additional experiences in practical clinical pathology procedures and microscopy.]

VTMED 630 Clinical Biostatistics for Journal Readers
Spring. 1 credit. Minimum enrollment 6; maximum enrollment 20. First-, second-, third-, and fourth-year veterinary students; others by permission of instructor. Letter grade. H. N. Erb.
Students become familiar with the statistical methods commonly used in veterinary clinical articles, are taught to recognize obvious misuse of those methods, and are taught to interpret the statistical results.

VTMED 631 Clinical Diagnostic Parasitology
Fall and spring. 0.5 credit. Prerequisite: VTMED 551. Third- and fourth-year veterinary students. S-U grades only. TBA with Dr. Frongillo, D. D. Bowman and M. K. Frongillo.
This course provides a chance to perform diagnostic parasitology methods using samples obtained from ongoing clinic cases. Students attend eight 1-hour sessions as they rotate through the ambulatory, community practice, and pathology rotations. In the ambulatory service (four sessions with students), diagnostics concentrates on the laboratory examination of samples from large animal cases that have been observed during the previous week. In the Community Practice Service, one hour concentrates on the examination of samples from ongoing cases, while a second hour consists of a discussion of the treatment of common endo- and ectoparasites. The two hours spent as part of the pathology rotation examine methods of recovering parasites from pathology specimens, including the examination of wet preparations and the digestion of tissues for parasite recovery. The course is considered to be a logical extension to the foundation course Host, Agent, and Defense and is expected to build on the didactic material presented in Large and Small Animal Parasitology.

VTMED 632 Senior Seminar
Fall and spring. 1 credit. First-, second-, and third-year veterinary students. S-U grades only. Must be completed in two consecutive terms (either fall to spring or spring to fall). R. O. Gilbert.
Attendance at 14 of the senior seminar sessions presented during the academic year constitutes acceptable completion of this course. This course does *not* fulfill the 1-credit Set VII minimum.

[VTMED 633 Introduction to Nontraditional Companion and Laboratory Animals
Spring. 1 credit. First-, second-, third-, and fourth-year veterinary students. Letter grades only. Not offered 2002. Staff.
This course is both laboratory and lecture based and deals with a wide variety of nontraditional species, other than dogs or cats, that might be brought into a small-animal practice. These can be either companion or laboratory animals and include rodents, lagomorphs, other small mammals, reptiles, amphibians, birds, fish, goats, sheep, potbellied pigs, primates, and llamas. Instruction in restraint and handling, breeding, husbandry, and general management information is provided for each species. This is followed, where possible, by laboratory sessions for observation, restraint, and physical examination.]

[VTMED 635 Introduction to the Professional Literature
Spring. 1 credit. Minimum enrollment 6; maximum enrollment 20. First-, second-, third-, and fourth-year veterinary students. Letter grades only. Not offered 2002. D. Lee.
This course introduces veterinary students to the professional and biomedical literature, including development of critical reading skills. Students become familiar with the broad range of professional and biomedical literature and are encouraged to develop a rigorous approach to journal and scientific article review. Secondary emphasis is on developing skills in library and bibliographic search techniques, as well as exploring the use of veterinary-related on-line information.]

VTMED 637 Introduction to Community Practice Service
Fall, winter, spring, and summer. 1 credit. First- and second-year veterinary students by permission of instructor. S-U grades optional. W. E. Hornbuckle.
This course introduces veterinary students to primary care small-animal clinical practice through direct exposure to the Community Practice Service of the Cornell University Hospital for Animals. Students observe and assist with restraint, examination and routine treatment of pets, and communication with clients. Successful completion requires satisfactory participation during 10 half-days of clinical service.

VTMED 638 Physiological Nutrition
Spring. 1 credit. Minimum enrollment 10; maximum enrollment 90. Second-, third-, and fourth-year veterinary students; others by permission of instructor. Letter grades only. F. A. Kallfelz.
This course provides information on the evaluation and formulation of rations for large and small animals. These concepts are applied in discussion on the nutrition requirements of these animals during maintenance, gestation, lactation, growth, stress, and aging. The course is recommended for all second-year veterinary students who do not have a strong background in ruminant, equine, canine, and feline nutrition. This course, or its equivalent, is necessary for comprehension of clinical nutrition concepts in Foundation Course V.

[VTMED 639 Veterinary Dentistry
Spring. 1 credit. Maximum enrollment 96. Second-, third-, and fourth-year students. Letter grades only. Not offered 2002. Staff.
This is an introductory-level course in small animal dentistry. It is a laboratory course that meets for two hours twice a week for 16 sessions. Basic concepts and practical topics in dental nomenclature, dental anatomy, oral/dental examination, routine dental care including prophylaxis, recordkeeping, genetics and breed differences, feline-specific dental disease, occlusion/malocclusion, periodontics, endodontics, restorative dentistry, oral surgery, and orthodontics are presented. Basic instrumentation, dental radiography, and materials used in dentistry are stressed. The class uses prepared specimens for all sessions.]

VTMED 640 Veterinary Aspects of Captive Wildlife Management
Spring. 2 credits. First-, second-, third-, and fourth-year veterinary students. Letter grades only. G. V. Kollias.
This course concentrates on principles of captive wildlife management, both clinical and nonclinical. Students are challenged to learn and integrate a variety of disciplines that are essential to managing wildlife successfully in a captive or semi-free-ranging environment. These disciplines include but are not limited to: species-specific (1) behavior and behavioral requirements, (2) nutritional requirements and problems, (3) natural history, (4) zoonotic and toxicological problems, (5) manual restraint and anesthesia, (6) preventive medicine, and (7) medical and legal ethics. In even-numbered years the course emphasizes non–North American wildlife species (examples include African, Asian, Australian, and Central and South American species), and in odd-numbered years the course focuses more on the North American (native) wildlife species.

VTMED 641 Approaches to Problems in Canine Infectious Diseases
Spring. 1 credit. Minimum enrollment 10; maximum enrollment 80. Second-, third-, and fourth-year veterinary students. Letter grades only. S. C. Barr.
The course consists of two 50-minute lecture periods each week for eight weeks. The letter grade is obtained entirely from the result of a written examination (usually multiple choice format) given in the final period. The course emphasizes the clinical aspects of the more common canine infectious diseases that are not covered in Foundation Course IV or V. The overall objective is to provide details about specific infectious diseases a future small animal practitioner may need to know

to effectively diagnose and treat these diseases. Clinical signs, presentation, clinicopathologic data, diagnostic choices, treatment plans, and prevention are emphasized. Most lectures are presented by clinical faculty and therefore the material is oriented toward practical skills in managing clinical cases.

[VTMED 642 Management of Fluid and Electrolyte Disorders
Spring. 2 credits. Minimum enrollment 20; maximum enrollment 40. Second-, third-, and fourth-year veterinary students. Letter grades only. Not offered 2002. D. F. Smith.
Students focus on clinical manifestations and the pathophysiologic mechanisms associated with fluid, electrolyte, and metabolic acid base disturbances in domestic animals. The course is divided into segments dealing with salt and water imbalances, potassium abnormalities, metabolic acidosis, metabolic alkalosis, and mixed acid-base disturbances.]

VTMED 643 Fundamental Aspects of Embryo Transfer
Spring. 1 credit. Maximum enrollment 16. Enrollment is done by lottery. Third- and fourth-year veterinary students or graduate students by permission of instructor. S-U grades only. J. R. Hill.
This course introduces the theory and practice of embryo transfer in domestic animals. Topics include: background, advantages and disadvantages, superovulation, embryo recovery techniques, embryo culture and manipulation, embryo transfer techniques, registration of offspring, import and export, and related topics in assisted reproductive technologies. Students are exposed to practical techniques of embryo transfer in cattle, small ruminants, horses, and swine. The course consists of lectures, demonstrations, and laboratory classes during which students practice techniques of embryo recovery, evaluation, handling, and transfer.

VTMED 644 Equine Surgical and Anesthetic Techniques
Winter. 1 credit. Prerequisite: VTMED 602 Anatomy of the Horse. Minimum enrollment 3; maximum enrollment 21. Enrollment is done by lottery. Third- and fourth-year veterinary students. S-U grades only. S. L. Fubini (coordinator) and other large-animal surgeons.
This course consists of five laboratories performing surgical procedures on ponies and cadaver specimens. It is the intent of this course not to make the students proficient in these procedures but to familiarize them with some specialized surgical techniques and to make them more enlightened referring practitioners. The course, therefore, is intended for students anticipating equine practice after graduation. This course is offered during a one-week period over winter intersession.

VTMED 645 Food Animal Surgical and Anesthetic Techniques
Winter. 1 credit. Prerequisite: VTMED 603 Anatomy of the Ruminant. Minimum enrollment 6; maximum enrollment 21. Third- and fourth-year veterinary students. S-U grades only. Enrollment is done by lottery. S. L. Fubini and other large-animal surgeons.
This course consists of five laboratories performing surgical procedures on sheep, calves, cadaver specimens, and adult cattle. It is the intent of this course not to make the students proficient in these procedures but to familiarize them with surgical techniques and to make them more enlightened referring practitioners. The course, therefore, is intended for students anticipating food animal practice after graduation. This course is offered during a one-week period over winter intersession.

VTMED 646 Llama Tutorial
Fall, spring, summer. 1 credit. Prerequisite: VTMED 540. Second-semester second-, third-, or fourth-year veterinary students. S-U grades only. Independent study. M. C. Smith.
This autotutorial or group tutorial course covers common problems of llamas and alpacas. Participants are provided with study guides consisting of brief case descriptions and sample study questions. Reference is made to textbooks, journal articles, videotapes, and (if available) a teaching llama or alpaca to assist students in finding the answers to the questions efficiently. Grading is based on an oral exam.

VTMED 647 Poisonous Plants
Fall. 1 credit. First-, second-, third-, and fourth-year veterinary students; others by permission of instructor. S-U grades only. R. Hillman and M. Smith.
Field trips demonstrate toxic plants growing in natural or cultivated settings. Lectures address economically important poisonous plants native to the United States. Information presented includes plant identification, natural habitat, toxic principles, clinical signs of toxicity, and treatment and prevention of poisoning in animals. Some of the major toxic principles found in plants and considered in detail in the course are nitrates, cyanide, oxalates, photodynamic agents, alkaloids, and mycotoxins.

VTMED 648 Clinical Management of Native Wildlife
Fall, spring, summer (credit given in fall). 1 credit. Enrollment not to exceed 20 students per semester, 2 students per rotation. First-, second-, third-, and fourth-year veterinary students by permission of instructor. Letter grades only. G. V. Kollias and staff.
This course introduces veterinary students to primary native wildlife care and to wildlife issues that practicing veterinarians face on a daily basis. Students are responsible for the assessment, physical examination, and medical care of native wildlife presented to the Cornell University Hospital for Animals by the public and local wildlife rehabilitators. Student activities are directly supervised and assessed by faculty wildlife clinicians on a daily basis. Successful completion of the course requires 40 hours of satisfactory supervised participation per semester in the clinic. Clinic times are appropriately scheduled throughout the semester. Students are required to submit two case summaries before the end of the semester and a log of their clinical hours.

VTMED 649 Introduction to Equine Practice
Spring. 0.5 credit. Maximum enrollment 30. First- and second-year veterinary students. Letter grades only. R. Hackett and C. Collyer.
This is an introductory course in equine husbandry intended for students with little or no experience working with horses. Lecture topics include horse breeds and colors, housing facilities and fencing, and overview discussions of the racing, showing, and breeding industries. Laboratories emphasize basic equine handling and restraint as well as feeds and bedding.

VTMED 652 Avian Medicine and Surgery
Spring. 2 credits. Minimum enrollment 20; maximum enrollment 80. Third- and fourth-year veterinary students. Letter grades only. G. V. Kollias and staff.
This course is designed to introduce third- and fourth-year veterinary students to the principles and practice of clinical avian medicine and surgery. The course is taught in a basic didactic lecture and discussion format with laboratories that reinforce concepts presented in the lectures.

VTMED 653 Advanced Equine Lameness
Spring. 1.5 credits. Minimum enrollment 7; maximum enrollment 21. Third- and fourth-year veterinary students. Enrollment is done by lottery. S-U grades only. N. Ducharme, A. Nixon, and staff.
This course is designed to help students understand the methodology and to develop the manual skills required for lameness examination in horses. Emphasis is on developing diagnostic skills. Specifically, students are expected to develop proficiency in the identification of clinical characteristics associated with recognized lamenesses and to localize the origin of the lameness. Teaching aids include video modules outlining various gait abnormalities. In addition, horses with specific gait abnormalities will be available for physical, radiographic, and ultrasonographic examination.

VTMED 654 Current Therapy in Equine Reproduction
Spring. Lec, 1 credit; lab, 0.5 credit. Lab minimum enrollment 12; maximum enrollment 24. Laboratory enrollment is done by lottery, if oversubscribed; concurrent enrollment in lecture is required. Third- and fourth-year veterinary students. Letter grades only. D. H. Volkmann and C. M. Schweizer.
This course covers advanced aspects of equine reproductive physiology. Reproductive management of mares and stallions using natural and artificial breeding strategies is discussed. Diagnosis, treatment, and prevention of common reproductive disorders are stressed. The laboratory component builds on skills acquired during Foundation Courses and provides experience in techniques important in equine theriogenology.

VTMED 655 Production Animal Theriogenology
Spring. Lec, 1 credit; lab, 1 credit. Lab, minimum enrollment 12; maximum enrollment 24. Laboratory enrollment is done by lottery. Concurrent enrollment in Production Animal Theriogenology Lecture is required. Third- and fourth-year veterinary students. Letter grades only. J. R. Hill.
This course deals with specific reproductive disorders of production animals as well as reproductive management of production units. Content includes reproductive biology of production animals, economic considerations, and medical and surgical approaches to management of reproductive disorders. Laboratory sessions are tailored to acquisition of specific skills fundamental to the practice of

theriogenology of production animals. Emphasis is on dairy cows.

VTMED 656 Special Problems in Equine Medicine
Spring. 1.5 credits. Minimum enrollment 10; maximum enrollment 30. Enrollment is done by lottery. Third- and fourth-year veterinary students. S-U grades only. T. Divers and staff.
This course is intended for students who plan to or may enter equine practice. In-depth study of important diseases, review of recent literature, health management, and hands-on procedures or demonstrations are the core of this course.

VTMED 657 Disorders of Large Animal Neonates
Spring. 1 credit. Minimum enrollment 10; maximum enrollment 100. First-, second-, third-, and fourth-year veterinary students. Letter grades only. D. Ainsworth.
The common medical problems of foals and calves, with emphasis placed on the neonatal period, are discussed. Specific topics examined in detail include disorders affecting the respiratory, gastrointestinal, and musculoskeletal systems. Students also spend several hours in the neonatal intensive care unit providing medical care of hospitalized patients under staff supervision.

VTMED 659 Equine Soft Tissue Surgery
Spring. 1 credit. Minimum enrollment 6; maximum enrollment 21. Third- and fourth-year veterinary students. Enrollment is done by lottery. Letter grades only. R. Hackett and staff.
This course, intended for students anticipating equine practice after graduation, builds on material presented in the foundation courses to provide supplemental instruction in surgical disorders of the horse. Lectures are case based and emphasize disorders likely to be encountered in equine practice (colic, traumatic injuries, upper respiratory tract disorders, prepurchase examination). Laboratories emphasize diagnostic and therapeutic procedures in which an entry-level equine practitioner should be competent.

VTMED 661 Surgical Pathology
Spring, summer, fall. Variable 1–2 credits. Second-, third-, and fourth-year veterinary students with permission of instructor. Letter grades only. S. McDonough.
This one- or two-week course (approximately eight hours per day for one credit per week) provides hands-on experience in the Surgical Pathology Service of the Department of Biomedical Sciences. Working with the attending pathologist, students examine tissue specimens histologically, propose diagnoses, and discuss their interpretations. Students may enroll in this course only through the Office of Student Records *within the official add/drop period*. All requests to enroll must be accompanied by the Supplemental Enrollment Form indicating Dr. McDonough's approval of the enrollment and the amount of credit to be awarded. *Second-year students* should not enroll for any term other than summer *unless* they have actually reserved a January or spring break slot through Dr. McDonough.

VTMED 665 Medical and Surgical Problems of Dairy Cattle—Emphasis on the Individual Animal
Spring. 1.5 credits. Minimum enrollment 6; maximum enrollment 28. Enrollment is done by lottery. Third- and fourth-year veterinary students. Letter grades only. S. Fubini and staff.
This course provides students with a special interest in dairy practice the opportunity for in-depth discussions of special problems in bovine medicine and surgery. Emphasis is on case discussions, physical examination techniques, and ethical and practical matters. The course emphasizes individual cow treatment.

VTMED 666 Small Animal Clinical Oncology
Spring. 1 credit. Third- and fourth-year veterinary students. Letter grades only. R. L. Page.
This course presents common tumor syndromes in small animals. Emphasis is placed on biological behavior, patient management, and client relations. Format includes lectures, journal club discussions, demonstrations, and seminars.

VTMED 667 Special Problems in Small Animal Medicine
Spring. 1 credit. Minimum enrollment 10; maximum enrollment 40. Third- and fourth-year veterinary students. S-U grades only. J. Randolph (coordinator) and staff.
During the four-week course, students work through selected problems in small-animal medicine. The course consists of a 2-hour weekly seminar. The focus is on the medical problems associated with cases using historic, clinical, clinical pathologic, and pathologic findings to elucidate basic pathophysiologic principles of disease. The overall objective is to give future small-animal practitioners skills in the approach to clinical problems with specific emphasis placed on history taking, clinical signs and examination skills, assessment of clinical pathology data and diagnostic materials (radiographs, ultrasounds), treatment plans, and prevention. The course expands knowledge gained in Foundation Course V and, under the instruction of a clinical faculty member, is aimed at facilitating the use of that knowledge into the practical skills of managing clinical cases.

[VTMED 668 Practice Management
Spring. 2 credits. Number of sections will be determined by enrollment. Third- and fourth-year veterinary students. S-U grades only. Not offered 2002. D. Lee.
Course participants form a veterinary group practice that includes the specialties of each person's interest. Topics are presented and discussed in the staff meeting format of the practice. Topics include basic practice organization, leadership styles, career planning, communication skills, facility management, human resource management, maintenance of standards, marketing and merchandising, building and maintaining clients, practice growth, finances, computing systems and information management, money management, legal issues and insurance, professional relations and responsibility, and maintaining an acceptable quality of life, including stress management. Various practitioners and practice managers speak to the group about their very different successful practices, concentrating on management and organizational skills.]

VTMED 669 Sheep and Goat Medicine
Spring. Lec, 1 credit; lab, 0.5 credit. Lab, concurrent enrollment in Sheep and Goat Medicine Lecture is required. Third- and fourth-year veterinary students. S-U grades only. M. Smith.
This course discusses diagnosis, treatment, and prevention of medical and surgical problems of individual small ruminants and of sheep and goat herds. Basic information on breeds, behavior, nutritional requirements, and management systems is supplied. Economically important contagious or metabolic diseases are discussed in depth. The diagnostic evaluation and differential diagnoses for common clinical presentations such as skin disease, neurologic disease, lameness, and mastitis are considered. Herd monitoring of economically important parameters and necropsy diagnosis of abortions and neonatal losses are addressed. Breeding systems, pregnancy diagnosis methods, and correction of dystocias are discussed and demonstrated in optional laboratory sessions.

VTMED 670 Drug Handling in the Body
Spring. 0.5 credit. Maximum enrollment 60. Second-, third-, and fourth-year veterinary students. Letter grades only. R. A. Cerione and G. A. Weiland.
This course provides an in-depth consideration of the pharmacological principles of administration, adsorption, distribution, metabolism, and elimination of drugs. Emphasis is on the conceptual basis of the pharmacokinetic considerations in the therapeutic use of drugs. The course builds on the pharmacological and physiological principles introduced in Foundation Course III.

VTMED 671 Autonomic Pharmacology
Spring. 0.5 credit. Maximum enrollment 80. Second-, third-, and fourth-year veterinary students. Letter grades only. G. A. Weiland.
This course provides an in-depth consideration of the pharmacological and physiological principles of autonomic pharmacology. Molecular, cellular, and organ system mechanisms are emphasized. The course explores in more detail the fundamental pharmacological and physiological principles of the effects of drugs on autonomic organs introduced in Foundation Course III.

VTMED 672 Antimicrobial Drug Therapy in Veterinary Medicine
Spring. 1 credit. Second-, third-, and fourth-year veterinary students. Letter grades only. W. S. Schwark.
The objective of this course is to familiarize students with antimicrobial drugs used in veterinary practice. The course builds on fundamental pharmacological and microbiological principles covered in Foundation Courses III and IV and considers antibacterial, antifungal, antiparasitic, and anticancer drugs from the point of view of unique pharmacokinetic properties, indications for clinical use, and potential toxicities as the basis for rational use.

VTMED 675 Fundamental Principles of Vertebrate Central Nervous System Pharmacology
Spring. 0.5 credit. Minimum enrollment 6. Second-, third-, and fourth-year veterinary students. Letter grades only. L. M. Nowak.
This course includes up-to-date knowledge of physiological and pharmacological aspects of the main central nervous system neurotrans-

mitter receptors and provides a basis for rational understanding of the drugs used during surgery and in treatment of neurological diseases.

VTMED 676 Clinical Ophthalmology
Spring. 0.5 credit. Third- and fourth-year veterinary students. S-U grades only. R. Riis, N. Irby, and T. Kern.
The principles and practice of entry-level veterinary ophthalmology introduced in Block V, Introduction to Veterinary Ophthalmology, are supplemented by lectures and discussions that emphasize species differences, basic surgical decision-making, and recognition of ocular conditions appropriate for referral.

VTMED 677 Dairy Production Medicine
Fall. 2 credits. Minimum enrollment 6; maximum enrollment 14. Third- and fourth-year veterinary students. S-U grades only. C. Guard.
This is an intermediate course in the techniques and procedures used by veterinarians in modern dairy practice. Many of these activities fall outside the traditional boundaries of medicine, surgery, and theriogenology and might include housing, facilities, manure management, and employee education. Data analysis, disease and productivity monitoring, and evaluation of deviations from targeted performance are used to plan cost-effective interventions or corrections, followed by continued surveillance to monitor their effect. Students are introduced to the dominant software currently used in dairy management. Local dairy herds serve as additional laboratories for class projects.

VTMED 678 Small Animal Theriogenology
Spring. 1 credit. Third- and fourth-year veterinary students. Letter grades only. D. H. Volkmann.
This is a distribution course in a lecture-based format designed to complement the knowledge gained in the theriogenology component of Foundation Course V, Animal Health and Disease. Content includes discussion of breeding management, infectious and noninfectious causes of infertility and pathology of the male and female reproductive tracts, their diagnosis and management. The emphasis of the course is on conditions affecting dogs and cats.

VTMED 679 Clinical Pharmacology
Spring. 0.5 credit. Third- and fourth-year veterinary students. S-U grades only. W. Schwark.
This course is offered after Blocks I–V and formal exposure to pharmacology course work is completed. The course is designed to familiarize students with drug use in the clinical setting and uses ongoing cases in the teaching hospital as a teaching tool. Pharmacological concepts are emphasized, with a focus on the rationale for drug choice, alternative drug choices available, pharmacokinetic considerations, and potential drug interactions/toxicities. This course is offered at the time students are about to embark on their clinical rotations. It is designed to emphasize practical aspects of pharmacology in the clinical setting, using basic concepts obtained during formal course work. The onus is placed on the student to explain/rationalize drugs employed in clinical cases in the teaching hospital.

VTMED 680 Behavior Problems of Horses
Spring. 1 credit. Prerequisite: one semester of veterinary curriculum. First-, second-, third-, and fourth-year veterinary students. S-U grades only. K. A. Houpt.
The goal of this course is to give veterinary students the ability to treat the behavior problems of horses. History-taking, counseling, diagnostic tests, follow-up, the importance of cooperation with the referring veterinarian, prevention of behavior problems, training techniques of value to the practitioner, and socialization of foals are presented.

VTMED 681 Behavior Problems of Small Animals
Spring. 1 credit. Prerequisite: one semester of veterinary curriculum. First-, second-, third-, and fourth-year veterinary students. S-U grades only. K. A. Houpt.
The goal of this course is to give veterinary students the ability to treat the behavior problems of cats and dogs. History-taking, counseling, and follow-up methods are presented. Each student has the opportunity to participate in three cases. Behavioral and pharmacological treatments for behavior problems are presented.

VTMED 682 Topics in Veterinary Emergency and Critical Care Medicine
Spring. 1 credit. Minimum enrollment 10; maximum enrollment 35. Enrollment is done by lottery. Third- and fourth-year veterinary students; all others by permission of instructor. S-U grades optional. P. Moon.
This course provides an introduction to emergency and critical care medicine. It is designed to have one to two topics per week. An introductory seminar presents basic information on the topic(s) at the beginning of the week followed by a two-hour group discussion later in the week. Although most of the cases are based on small-animal cases, the same principles apply to both large- and small-animal situations. Topics that might be covered include: triage, emergency fluid therapy, cardiac and pulmonary emergencies, nutritional support, common toxicology problems, emergency surgical procedures (chest tubes, tracheotomies), and basic and advanced cardiopulmonary resuscitation. When two courses (i.e., section "A" and "B") are offered in the same year, different topics are covered in each course.

VTMED 685 Physiology of Pregnancy
Spring. 2 credits. Maximum enrollment 20. Second-, third-, and fourth-year veterinary students. Letter grades only. P. W. Nathanielsz.
This course is presented in lecture fashion. One major reference per lecture is assigned each week. Subjects covered are placental function, fetal growth, central nervous system development, fetal breathing, biorhythms in maternal and fetal physiology, parturition, and adaptations to newborn life.

VTMED 689 Fundamentals of Ruminant Digestion and Metabolism
Spring. 0.5 credit. Minimum enrollment 5; maximum enrollment 50. First-, second-, third-, and fourth-year veterinary students; selected graduate students by permission of instructor. Letter grades only. T. R. Houpt.
This course is designed for the student who has little or no previous course work in ruminant digestive physiology. It consists primarily of lectures surveying: the functional aspects of control of feed intake; salivation; reticuloruminal motility, including rumination and eructation; microbial flora and fauna; fermentation in reticulorumen (digestion of carbohydrates, proteins and fats); ruminal gas formation; absorption of short-chained fatty acids; special features of ruminal nitrogen metabolism; passage of nutrients to lower tract; and a brief consideration of the functions of omasum, abomasum, and small and large intestines. Emphasis is on the differences of the ruminant digestive processes from those of the simple-stomached animals.

VTMED 690 Molecular and Genetic Basis of Inherited Disorders in Animals and Application to Clinical Medicine
Spring. 2 credits. Minimum enrollment 5; maximum enrollment 15. First-, second-, third,- and fourth-year veterinary students; graduate and undergraduate students also welcome. Letter grades only. Offered even-numbered years. J. Ray.
This course introduces the molecular basis of inherited diseases in domestic animals. Topics include: several inherited metabolic defects causing systematic malfunctions; muscle and bone abnormalities; retinal degeneration; and failure of the immune systems. Techniques to characterize genes and mutations. Use of molecular techniques for diagnosis and prevention. Use of molecular tools for the treatment of inherited disorders.

VTMED 692 Current Concepts in Reproductive Biology
Fall. 3 credits. First-, second-, and third-year veterinary students or appropriate undergraduate/graduate training. Letter grades only. Lec, 2 hours each week; disc, 2 hours each week; T R 10:10–12:05. Offered odd-numbered years. J. Fortune, W. R. Butler, and staff.
This is a team-taught survey course in reproductive physiology/endocrinology. Lectures are given by several reproductive biologists on various aspects of male reproductive function (endocrine regulation, testis function, spermatogenesis, and sperm physiology/function); female reproductive function (endocrinology, ovarian development and function, oocyte physiology/function); fertilization and early embryo development; pregnancy; parturition; puberty; and reproductive technology. Students participate in the form of discussions and/or presentations.

VTMED 695 Genetic Basis of Eye Diseases
Spring. 1 credit. Minimum enrollment 5; maximum enrollment 14. First-, second-, third-, and fourth-year veterinary students. Letter grades only. G. Aguirre.
This course covers the molecular and genetic basis of inherited eye diseases in domestic and laboratory animals. It is aimed at the professional student in the veterinary curriculum but is open to graduate-level students. The course is given in a combination lecture/seminar format, with students leading and actively participating in discussions. The students are expected to do assigned and independent outside research, both for class discussions and the paper.

[VTMED 696 Fundamental Principles and Techniques of Small Animal Anesthesia: Dogs, Cats, and Birds.
Spring. 1 credit. Minimum enrollment 15. Third- and fourth-year veterinary medical students. Not offered 2002. P. F. Moon, R. D. Gleed, and J. W. Ludders.
This course is designed for the veterinary medical student interested in small-animal practice. The course consists of lectures, case discussions, and development of anesthetic protocols for routine and complicated cases. Subjects to be covered include: anesthetic management for elective and emergency surgery, management of the high-risk patient, fluid therapy, drug interactions, pain management, and the management of anesthesia-related complications, cardiopulmonary resuscitation, and post-anesthetic management. While fundamental concepts and recent advances in anesthesia are discussed, the practical application of anesthetic principles and techniques are a major objective of the course.]

[VTMED 697 Fundamental Principles of Large Animal Anesthesia: Equine and Mixed Animal Practice
Spring. 1 credit. Minimum enrollment 15. Third- and fourth-year veterinary medical students. Not offered 2002. J. W. Ludders, R. D. Gleed, and P. F. Moon.
This course is designed for the veterinary medical student interested in equine or mixed animal practice. The course consists of lectures, case discussions, and development of anesthetic protocols for routine and complicated cases. Subjects to be covered include: anesthetic management for elective surgery, field anesthesia, management of the high-risk patient, fluid therapy, drug interactions, pain management, and the management of anesthesia-related complications, cardiopulmonary resuscitation, and post-anesthetic management. While fundamental concepts and recent advances in anesthesia are discussed, the practical application of anesthetic principles and techniques is a major objective of the course.]

VTMED 698 Special Projects in Veterinary Medicine
Fall, winter, spring, summer. Variable 1–4 credits. Must be arranged with a College of Veterinary Medicine tenure-track faculty member. S-U grades optional.
This course provides the opportunity for students to work individually with a faculty member to pursue an area of particular interest and, typically, not part of the established curriculum. Specific course objectives and course content are flexible and reflect the scope and academic expertise of the faculty.

VTMED 699 Research Opportunities in Veterinary Medicine
Fall, winter, spring, summer. Variable 1–4 credits. Must be arranged with a College of Veterinary Medicine tenure-track faculty member. S-U grades optional.
This course provides the opportunity for individual students to work in the research environment of faculty involved in veterinary or biomedical research. Specific course objectives and course content are flexible and reflect the specific research environment. Research projects may be arranged to accumulate credit toward requirements in Distribution Sets I, II, III, IV, and V.

VTMED 700 Large Animal Theriogenology Service
Spring. 2 or 4 credits. Prerequisite: VTMED 551. Maximum enrollment 4 per rotation. Third- and fourth-year veterinary students. Letter grades only. D. H. Volkmann, C. Schweizer, J. R. Hill, R. O. Gilbert.
Two week exposure to clinical procedures in large animal theriogenology as provided by CUHA patient load and augmented by teaching herd(s) (equine and bovine) animals.

VTMED 701 Cardiology Service
Fall and spring. 2 credits. Prerequisite: VTMED 551. Minimum enrollment 1 per rotation; maximum enrollment 2. Third- and fourth-year veterinary students. Letter grades only. S. Moise.
The purpose of the cardiology rotation is to provide students with the opportunity to put into practice what they have learned in the foundation years. The management of the most common cardiac diseases is emphasized including congestive heart failure, arrhythmias, and secondary cardiac diseases. All species are examined, large and small, although the majority are small animals. Diagnostics, including cardiovascular physical examination, electrocardiography, radiography, and echocardiography, are taught. The rotation includes clinical work, didactic teaching, and self-initiated digging for information.

VTMED 702 Laboratory Animal Medicine
Fall and spring. 2 credits. Prerequisite: VTMED 551. Maximum enrollment 4 per rotation. Third- and fourth-year veterinary students. Letter grades only. F. Quimby and staff.
The practice of laboratory animal medicine requires a combination of preventive programs, clinical skills, knowledge of various species' biologies, familiarity with research methodology, and acquaintance with state and federal regulations. This course is offered as a two-week introduction to that specialty. Students accompany laboratory animal veterinarians on clinical rounds of Cornell's research animal housing and participate in laboratory diagnostic work. Review sessions are conducted on the biology, medicine, pathology, and husbandry of rodents, rabbits, and primates and on current legislation regulating the care and use of research animals. The course may include a field trip to the research animal facilities of Rockefeller University, the Cornell University Medical College, Marshall Farms, and the Laboratory of Experimental Medicine and Surgery in Primates.

VTMED 703 Clinical Wildlife, Exotic, and Zoo Animal Medicine
Fall, winter, spring, summer. 2 credits. Prerequisite: VTMED 551. Maximum enrollment 2 per rotation. Third- and fourth-year veterinary students. Letter grades only. G. V. Kollias and staff.
This course introduces students to primary medical care of nontraditional pet species, zoo animals, and native wildlife. Students, directly supervised by the attending clinician, are responsible for the assessment, physical examination, and medical management of exotic animal species presented to the Cornell University Hospital for Animals. Other opportunities available to assist in the development of clinical skills in wildlife, zoo and exotic animal medicine include the wildlife clinic cases, ongoing wildlife research and service projects, and trips to the Rosamond Gifford Zoo. Successful completion of the course requires satisfactory performance during this 14-day clinical rotation.

VTMED 704 Quality Milk
Fall or spring. 2 credits. Prerequisite: VTMED 551. Third- and fourth-year veterinary students. Letter grades only. R. Gonzalez, Y. Schukken, D. Wilson and staff.
This course covers the causes, diagnosis, treatment, and prevention of bovine mastitis. The role of management practices is stressed. The course includes lectures, readings, discussions, laboratory exercises, and farm visits as part of the Quality Milk Promotion Services—New York State Mastitis Control Program. Participants are expected to complete a case study on a dairy farm with udder health problems and present their findings to the producer and farm personnel. Grading is on performance during the course and a final exam.

VTMED 705 Special Opportunities in Clinical Veterinary Medicine
Fall, spring, and summer. Prerequisite: VTMED 551. Third- and fourth-year veterinary students. S-U grades only.
This course provides opportunities for students finished with Foundation Course V to explore professional areas not available through the regular curriculum. Blocks of two to four weeks are usually spent at other teaching hospitals, research laboratories, or zoological facilities. Student proposals are submitted to the associate dean for academic programs for review and approval. On-site supervisors of the block act as ex-officio faculty members and are required to evaluate each student formally.

VTMED 707 Poultry Medicine and Production Rotation
Fall. 2 credits. Prerequisite: VTMED 551 and VTMED 616, Diseases of Birds, is recommended. Third- and fourth-year veterinary students. K. A. Schat.
This course is a two-week rotation that takes place at the University of St. Hyacinthe or the University of Guelph in alternating years. The course provides students with an introduction in practical poultry medicine by a combination of lectures, discussions, and laboratory sessions including postmortem examinations. Students also visit hatcheries, broiler, layer, and turkey farms.

VTMED 708 Clinical Oncology
Fall and spring. 2 credits. Prerequisite: VTMED 551. Maximum enrollment 4 per rotation. Third- and fourth-year veterinary students. Letter grades only. R. Page.
Management and prevention of cancer in companion animals represents a significant component of the practice of veterinary medicine. The focus of this clinical rotation is the development of a comprehensive set of skills necessary for a veterinarian to become an advocate for the client/patient with cancer. These skills include appropriate initial evaluation of animals with cancer, sensitive and effective client and referring veterinarian communication, ability to access relevant information from numerous sources related to cancer management, understand and apply principles of surgical, medical, and radiation oncology as well as techniques specifically related to minimize pain and treatment-related effects in cancer patients.

VTMED 720 Issues and Preventive Medicine in Animal Shelters

Spring. 1 credit. Prerequisite: VTMED 540. Minimum enrollment 5; maximum enrollment 30. Second-, third-, and fourth-year veterinary students. Letter grades only. J. M. Scarlett and staff from the American Society for Prevention of Cruelty to Animals.

Veterinarians often work for or with animal shelters, serve on shelter boards of directors, are community resources for issues relating to companion animal welfare, participate in spay and neuter programs, and influence the quality of the human-animal bond. This course addresses the history of the humane movement, role of the veterinarian in relation to shelters, preventive and palliative health management (including highlighting diseases of major concern), issues surrounding euthanasia, reasons for relinquishment, programs for behavior modification, and the legal concerns of shelters. These issues are addressed using lectures and large group discussions.

VTMED 721 Timely Topics in Veterinary Parasitology: Large Animal

Spring. 0.50 credits. Minimum enrollment 2. Third-, and fourth-year veterinary students. S-U grades only. D. D. Bowman.

This course presents an in-depth look at one or a few parasites of special interest relative to large-animal medicine. The course presents details of taxonomy, biology, epidemiology, clinical presentation, and preventive and curative treatment. Efforts are made to discuss those aspects of the disease as it relates to the practical control of these and in-depth coverage of primary literature relating to the parasite being discussed. Topics vary annually. The course is presented in a lecture/discussion format.

VTMED 722 Timely Topics in Veterinary Parasitology: Small Animal

Spring. 0.5 credits. Minimum enrollment 2. Third- and fourth-year veterinary students. S-U grades only. D. D. Bowman.

This course presents an in-depth look at one or a few parasites of special interest relative to small-animal medicine. The course presents details of taxonomy, biology, epidemiology, clinical presentation, and preventive and curative treatment. Efforts are made to discuss those aspects of the disease as it relates to the practical control of these and in-depth coverage of primary literature relating to the parasite being discussed. Topics vary annually. The course is presented in a lecture/discussion format.

VTMED 723 Bacteria and Fungi in Veterinary Medicine

Spring. 2 credits. Minimum enrollment 8; maximum enrollment 80. Second-, third-, and fourth-year veterinary students. Letter grades only. D. P. Debbie.

This course provides an overview and listing of important bacterial and fungal diseases of domestic animals (cow, horse, sheep, pig, goat, dog, cat) in preparation for medicine courses. The etiology, pathogenesis, host response, and prevention are emphasized. Avian, zoonotic, and exotic (foreign animal) bacterial and fungal diseases are covered in less detail because they are covered in other courses. The course also provides insight into diagnostic procedures for bacterial and fungal diseases such as available tests, what samples to take, how to handle samples, and how diagnostic procedures are performed.

[VTMED 725 Diagnostic Cytology

Spring. 1 credit. Prerequisite: VTMED 628. Maximum enrollment 5. Second-, third-, and fourth-year veterinary students. S-U grades only. Not offered 2002.

This two-week course provides in-depth experience in preparation and interpretation of cytological specimens. Evaluation of the cytological specimens is incorporated into clinical cases, so that the results are interpreted with respect to the provided case material. The primary mode of instruction is based on faculty-driven microscopic slide evaluation. Students are required to evaluate the slides independently before the microscope sessions. Selected mini-tutorials and laboratories complement the microscopic sessions. The course builds on concepts previously addressed in the Foundation Blocks 3 and 4 and in the Clinical Pathology Distribution Course (VTMED 628). This course is limited to students participating in or who have completed the Clinical Pathology Distribution Course.]

VTMED 726 Reptile Medicine and Surgery

Spring. 1 credit. Minimum enrollment 10; maximum enrollment 40. Third-, and fourth-year veterinary students. Letter grades only. G. V. Kollias.

This course is designed to introduce third- and potentially fourth-year veterinary students to the principles and practices of reptile medicine and surgery. The course is taught in a basic lecture and discussion format with laboratories (limited) reinforcing concepts presented in the lectures.

VTMED 730 Vaccines: Theory and Practice

Spring. 1 credit. Prerequisite: introductory course in immunology or VTMED 540 or VETMI 315. Minimum enrollment 10; maximum enrollment 40. Second-, third-, and fourth-year veterinary students and graduate students; others by permission of instructor. Letter grades only. Grades based on a final examination and one term report. Offered even-numbered years. T. Clark.

This course provides an overview of vaccines used in clinical practice, as well as an in-depth look at vaccine development. Emphasis is placed on the most recent advances in vaccine design and delivery, including the use of recombinant DNA techniques for targeting specific immunological responses. Lectures touch on vaccines commonly used in veterinary practice and address in detail the use of carriers, adjuvants and immunostimulants; attenuated pathogens; synthetic peptides; recombinant subunit vaccines; viral and bacterial vectors for vaccine delivery; synthetic antibodies; and genetic immunization with "naked" DNA.

[VTMED 732 Veterinary Clinical Toxicology

Spring. 1.5 credits. Second-, third-, and fourth-year veterinary students. S-U grades optional. Not offered 2002. L. Thompson and K. Earnest-Koons.

This course provides the veterinary student with a solid introduction to concepts and principles of toxicology and how they are applied in the clinical setting. Students learn about specific common toxicants, clinical signs in affected animals, and treatment protocols for the toxicants in question. Students also gain an understanding of the clinical approach to suspected or unknown toxicoses, sample collection and handling, and resources available for clinical toxicologic problems. The course is conducted with two 1-hour lectures per week and one hour-long large-group discussion per week. The class meets two days per week, the first day for one hour and the second day for two hours. Grades are based on weekly quizzes, a final exam, a short paper and/or oral participation.]

[VTMED 733 Selected Infectious Diseases of Swine

Spring. 1.5 credits. Minimum enrollment 6; maximum enrollment 80. Second-, third-, and fourth-year veterinary students. S-U grades optional. Not offered 2002. K. Earnest-Koons.

This course provides veterinary students with a solid introduction to concepts and principles of swine infectious diseases and how they are treated in the clinical setting. Students learn about specific infectious diseases, clinical signs in affected animals, and treatment protocols for the diseases in question. Students also gain an understanding of the clinical approach to suspected or unknown infectious agents, sample collection and handling, and resources available for infectious disease diagnosis. The course is conducted with two 1-hour lectures per week and one hour-long large-group discussion per week. The class meets three days per week for one hour each. Grades are based on weekly quizzes, a final exam, a short paper and/or oral presentation.]

VTMED 735 Special Topics in Ambulatory and Production Animal Medicine.

Fall, winter, spring, and summer. Variable 1–2 credits. Prerequisite: VTMED 560. Enrollment is done by lottery. Second-, third-, and fourth-year veterinary students. Letter grades only. M. E. White and staff.

This course provides specialized experiences in the Ambulatory and Production Medicine Service. The course consists of participation in scheduled and emergency farm calls and completion of projects designed to provide experience in herd problem solving, records analysis and implementing herd-health programs. Clinical service assignments are planned to meet individual student goals. Examples of focus areas available include livestock production medicine, dairy reproductive examinations, small-ruminant medicine, and equine ambulatory practice.

VTMED 736 Veterinary Diagnostic Imaging: Anatomy and Interpretation

Spring. 1.5 credits. Minimum enrollment 20; maximum enrollment 50. First- and second-year veterinary students by permission of instructor. Third- and fourth-year veterinary students. Letter grades only. P. Scrivani.

The course is designed to emphasize the relevance of a solid foundation in veterinary anatomy as it clinically applies to diagnostic imaging. Additionally, the course is designed to provide students with an understanding of the strengths and limitation of diagnostic imaging by discussing interpretation principles, pitfalls and interpretations, and measurements obtained through lectures, laboratory exercises, weekly quizzes, and reading assignments. Integration of these objectives culminates in weekly laboratory exercises where students must make or evaluate decisions regarding patient management based on evaluation of clinical signs and imaging examinations. The "Roentgen-Sign"

approach to diagnostic imaging interpretation is used as a model.

VTMED 737 Principles of Pathology
Spring. 1.5 credits. Minimum enrollment 6; maximum enrollment 40. Second-, third-, and fourth-year veterinary students. Letter grades only. S. McDonough and K. Earnest-Koons.

Principles of Pathology is intended for students who wish to strengthen and broaden their knowledge of the pathologic basis of disease. Fundamental biologic processes as revealed by gross and microscopic pathologic changes are emphasized. Molecular mechanisms are integrated into the discussion where appropriate. General pathologic processes are organized into a logical and uniform system in order to facilitate comprehension and learning with particular attention paid to definition and proper usage of terminology. The course includes two lectures per week and a one-hour large-group discussion. The large-group discussion allows students to apply general knowledge gained in lecture to a specific problem. Approximately half of the large-group discussions are held in the Necropsy Teaching Laboratory using actual diseased organs for illustration of general pathologic principles.

VTMED 738 Veterinary Parasitology
Spring. 2.5 credits. First-, second-, third-, and fourth-year veterinary students. Letter grades only. D. D. Bowman

This course provides a basic introduction to animal parasites of veterinary importance, concentrating mainly on the biology, control, and diagnosis of protozoan and metazoan parasites. Emphasis is given to parasites representative of significant disease processes or of significant clinical importance to veterinarians. The course elaborates on the biology and pathogenesis of these major pathogens with the ultimate goal being to maximize the recognition of the major disease manifestations induced by the different groups of organisms. Laboratories stress certain aspects of some important parasite groups.

[VTMED 739 Viruses in Veterinary Medicine
Spring. 1.5 credits. Maximum enrollment 90. Second-, third-, and fourth-year veterinary students. Letter grades only. Offered odd-numbered years. C. R. Parrish and J. Baines.

This course is designed to supplement the information provided in the Foundation Courses, particularly courses IV and V. The objective is to provide, in a survey form, an overview of the major groups of viruses, which infect animals, and to give a summary of the diseases that they cause. The diseases, which are most commonly encountered in veterinary practice, are given the greatest amount of the available time, and diseases which are less frequently seen are given less detailed coverage. The properties of the viruses, their general pathogenic mechanisms, diagnostic methods, and some specific examples are covered.]

VTMED 745 Dynamics of Dairy Herd Health and Management
Spring. 1 credit. First-, second-, third-, and fourth-year veterinary students. Letter grades only. Y. T. Grohn and L. D. Warnick.

Competitive pressure, increasing input costs, and comparatively stagnant milk and salvage values require dairy producers to become more efficient. The current trend of increasing herd size drives changes in management. Dairy cattle are handled in groups, although individual cow health and productivity fundamentally underpin the financial success of the dairy enterprise. Veterinarians are called upon to advise dairy producers not only in matters of herd health but increasingly in matters of productivity and management decision making. Identifying opportunity areas to improve productivity and ultimately profitability requires modern veterinarians to recognize and solve complex and interdependent milk production, reproduction, and health issues. Until the advent of the new veterinary curriculum, biological systems were often taught in isolation. Yet there are research models that integrate the dynamic nature of dairy production, health, management, and economics through epidemiological and economic modeling. Despite the existence of such advanced research models, they have not been integrated fully into the curriculum. The goal of this course is to teach students the dynamic relationships of herd performance parameters with dairy herd health and management. This is done with a combination of lectures and exercises using two computer simulation models. The following topics are addressed: (1) how often production diseases occur and when, (2) how they are interrelated, (3) the impact of disease on milk production, reproductive performance, and risk of culling, and (4) how to use this information in production medicine. The format of this eight-week course (two days per week) is a lecture one day and hands-on work with computer simulation models on the other day.

Biomedical Sciences

VTBMS 346 Introductory Animal Physiology (also BIOAP 311) (Undergraduate)
Fall. 3 credits. Prerequisites: BIOG 105, BIOG 106, or BIOG 101, BIOG 102, BIOG 103, BIOG 104, BIOG 107, BIOG 108; CHEM 207, CHEM 208, or CHEM 206, or CHEM 215, CHEM 216; MATH 106, MATH 111 or MATH 191 or AP credit for any of the above; or one year of college-level biology, chemistry, and mathematics. S-U grades optional. M W F 11:15. E. R. Loew.

A general course in animal physiology emphasizing principles of operation, regulation, and integration common to a broad range of living systems from the cellular to the organismal level. Structure-function relationships are stressed along with underlying physical-chemical mechanisms.

VTBMS 600 Special Projects in Anatomy
Fall, spring. 1 credit per 2.5-hour period. By permission of instructor. S-U grades only. Biomedical science staff.

VTBMS 628 Graduate Research in Animal Physiology (Graduate) (also BIO S 719)
Fall, spring. 1–3 credits. By written permission of department chairperson and faculty mentor who will supervise the work and assign the grade. S-U grades optional.

Similar to Biological Sciences 499 but intended for graduate students who are working with faculty members on an individual basis.

[VTBMS 639 Autotutorial in Laboratory Animal Medicine and Science
Spring. 1–3 credits. Letter grades only. Not offered 2002.

This course is offered to individuals interested in pursuing various aspects of laboratory animal medicine and science in depth. A variety of resources are available to assist students in their research on a particular topic: the library of the Division of Laboratory Animal Medicine, including the autotutorial library; the university libraries; and special information collected from other institutions. Grades are determined on the basis of a paper, an oral presentation, or the creation of an audiovisual teaching aid, any of which may be selected by the student.]

VTBMS 700 Predictions of Form or Phlogeny
Spring. 1 credit. By permission of instructor. S-U grades optional. J. W. Hermanson.

Form and function are often discussed as a correlated entity in biology. This seminar group starts with the question, Does form really predict function? This is addressed initially with respect to the analysis of paleobiology but then encompasses examples of experimental functional morphology. In particular, there is a growing body of experimental data demonstrating that diverse functions can be achieved with nearly identical morphologies, and that the functional diversity may better be explained by behavior or environmental factors. Might these observations refute current theories about the origin of flight in extinct organisms (i.e., the cursorial or ground-up theory of flight versus the arboreal gliding theory of flight evolution)? Specific topics pursued are selected by participants in this course. Participation is open to interested graduate students, advanced undergraduate students, and veterinary students.

[VTBMS 713 Cell Cycle Analysis
Spring. 1 credit. S-U grades only. Not offered 2002. A. Yen.

Current topics in the control of mammalian cell division are discussed, including growth factors and oncogenes.]

VTBMS 720 Special Problems in Physiology (Graduate)
Fall, spring. 1–3 credits. By permission of instructor. Laboratory work, conferences, collateral readings, and reports. Adapted to the needs of students. S-U grades optional.

VTBMS 788 Seminar in Surgical Pathology
Fall, spring. 1 credit. Intended for residents; third- and fourth-year veterinary students may attend. Letter grades only. B. A. Summers and staff.

The major objective of this discussion and seminar course is to introduce the residents to the discipline of surgical pathology. Selected material from the Surgical Pathology Service is prepared in advance for independent review by the residents. The material is presented in a slide-seminar format by the residents under the review of the faculty. Emphasis is placed on pathogenesis, etiology, and pathologic descriptions of the lesions. In addition, appropriate guest lecturers cover specific areas of interest and special topics not encountered in the departmental service programs.

[VTBMS 796 Medical Primatology
Fall. 1 credit. For residents and graduate students by permission of instructor. Offered even-numbered years; next offered fall 2002.
This course is a survey of major diseases, medical care, and management techniques for all life stages of primates. Topics include physical examination, restraint anesthesia, housing, and management of various nonhuman primate species; bacterial, viral, and parasitic diseases; noninfectious diseases; infant and nursery care reproduction and behavioral considerations; and therapeutics.]

VTBMS 811 Advanced Physiology Methods I (also BIO S 811) (Graduate)
Fall. 2 credits. Enrollment limited. Prerequisite: graduate student status or permission of course coordinator. S-U grades only. Lab TBA. J. Ray.
This is a course primarily for graduate students in physiology and related disciplines. Experiments are carried out in the laboratories of physiology faculty members to acquaint students with the latest techniques and methods in physiological research. Three modules are offered each semester by arrangement with the course coordinator.

VTBMS 812 Advanced Physiology Methods II (also BIO S 812) (Graduate)
Spring. 2 credits. Enrollment limited. Prerequisite: graduate student status or permission of course coordinator. S-U grades only. Lab TBA. J. Ray.
This is a course primarily for graduate students in physiology and related disciplines. Experiments are carried out in the laboratories of physiology faculty members to acquaint students with the latest techniques and methods in physiological research. Three modules are offered each semester by arrangement with the course coordinator.

Clinical Sciences

VETCS 700 Pathophysiology of Gastrointestinal Surgery
Fall. 1.5 credits. S-U grades only. Offered every third year. N. G. Ducharme.
Normal anatomy and physiology of the gastrointestinal system in carnivores, herbivores and ruminants is presented initially. This is followed by in-depth discussion of the pathophysiological mechanisms and sequelae of gastrointestinal obstructions including reperfusion injury, peritonitis, adhesions and short bowel syndrome. The emphasis of this course is development of advanced understanding of surgically relevant gastrointestinal problems that lead to appropriate decision making.

VETCS 701 Pathophysiology of Orthopedic Surgery (Graduate)
Spring. 1.5 credits. Prerequisites include DVM, MD, or equivalents or approval of instructor. S-U grades only. Offered every third year. Next offered spring 2003. E. J. Trotter.

[VETCS 702 Pathophysiology of Cardiopulmonary Surgery (Graduate)
Fall. 1.5 credits. Prerequisite: DVM degree or equivalent. S-U grades only. Offered every third year. Next offered fall 2002. R. P. Hackett, S. L. Fubini, N. G. Ducharme, H. J. Harvey.
Using lectures and group discussions, the objective of this course is to explain the pathophysiology of various cardiovascular diseases (cardiac arrest, cardiac arrhythmia under anesthesia) and airway disease (thoracic and upper airway disease). As a basis for these abnormalities, cardiopulmonary hemodynamics and biomechanical aspects of ventilation are reviewed. The emphasis is placed on understanding these mechanisms and outlining the surgeon's response to them.]

[VETCS 703 Surgical Principles and Surgery of the Integumentary System (Graduate)
Spring. 1.5 credits. For graduate DVMs (or equivalent) in residency or graduate training programs. S-U grades only. Offered every third year. Next offered spring 2003.
This course is designed for surgery residents and graduate students. It is largely discussion format and examines surgical principles and surgery of the integumentary system.]

[VETCS 704 Pathophysiology of Urogenital Surgery (Graduate)
Fall. For graduate DVMs or equivalent in residency or graduate training programs. 1.5 credits. S-U grades only. Offered every third year. Next offered fall 2003. S. Fubini.
This course is designed to review and discuss urogenital surgical procedures in animals and the rational basis for them. Pathophysiology will be stressed. Some classes will consist of reprints with discussion.]

VETCS 705 Animal Pain and Its Control
Spring. 2 credits. By permission of instructor. S-U grades optional. R. D. Gleed, J. W. Ludders, and P. F. Moon.
This course is open to third- and fourth-year veterinary medical students, interns, residents, graduate students, and postdoctoral associates who are interested in the fundamental and applied concepts of pain in animals. The course emphasizes the physiologic and pathophysiologic mechanisms involved in pain perception by animals, their responses (physiological and behavioral) to pain, and the pharmacologic mechanisms underlying analgesic therapy. The subject material is presented through lectures, group discussions, group readings, and group evaluation of analgesic protocols.

[VETCS 706 Pathophysiology of Neurologic Surgery (Graduate)
Spring. 1.5 credits. Prerequisite: DVM, MD, or equivalent or approval of instructor. S-U grades only. Offered every third year. Next offered spring 2004. A. J. Nixon, E. J. Trotter.
This course provides specialized training in neurosurgical techniques and application and discusses pathophysiologic implications of neurosurgical and neurologic diseases.]

VETCS 710 Advanced Veterinary Anesthesiology I
Fall, winter. 1 credit. Prerequisite: VTMED 568 Veterinary Anesthesiology or permission of instructor. Third- and fourth-year veterinary students, graduate students, interns, and residents. S-U grades only. P. F. Moon and staff.
The content of this course is designed for preparation for the American College of Veterinary Anesthesiology examinations. However, the course is also suitable for interns and for residency training in other areas such as surgery and internal medicine. Speakers are from both inside and outside the college. Topics cover the basic sciences as they apply to anesthesiology such as physics and engineering, applied pharmacology, physiology, and pathology. Clinically oriented lectures are also given concerning specific anesthetic techniques and species-specific differences in response to anesthetic drugs.

VETCS 711 Advanced Veterinary Anesthesiology II
Fall, winter, spring. 1 credit. Prerequisite: VTMED 568, Veterinary Anesthesiology or permission of instructor. Third- and fourth-year veterinary students, graduate students, interns, and residents. S-U grades only. P. F. Moon and staff.
The content of the course is designed for preparation for the American College of Veterinary Anesthesiology examinations. However, the course is also suitable for interns and for residency training in other areas such as surgery and internal medicine. Speakers are from both inside and outside the college. Topics cover the basic sciences as they apply to anesthesiology such as physics and engineering, applied pharmacology, physiology and pathology. Clinically oriented lectures are also given concerning specific anesthetic techniques and species-specific differences in response to anesthetic drugs.

Microbiology and Immunology

VETMI 315 Basic Immunology (Undergraduate) (also Biological Sciences 305)
Fall. 3 credits. Strongly recommended: basic courses in microbiology, genetics, and biochemistry. S-U grades optional. J. A. Marsh.
This course is a survey of immunology, with emphasis on the cellular and molecular bases of the immune response. More information is available at the biog305 courseinfo web site.

[VETMI 320 Principles of Toxicology (Undergraduate) (also Biological Sciences 320 and Toxicology 320)
Spring. 3 credits. Prerequisites: one year each of introductory biology and chemistry, with lab; one semester of organic chemistry lecture or waiver by instructor. S-U grades optional. T R 1:25–2:40. Not offered 2001–2002. S. Penningroth, R. Dietert, and S. Bloom.
This course is an introduction to the interdisciplinary science of toxicology, drawing on material from biology, chemistry, pharmacology, ecology, earth science, risk analysis, and policy studies. Basic principles of toxicological science are presented and illustrated by case examples, such as pesticide toxicity to wildlife reproduction and human health risk assessment at a Superfund hazardous chemical waste site. Chemical risk management is described as a sociopolitical process involving the integration of scientific, economic, and cultural factors.

Independent student projects include a toxic chemical profile and a team analysis of hypothetical "environmental risk scenarios." Periodic talks by toxicology faculty acquaint students with basic research in this interdisciplinary branch of biological science. This is an introductory-level course in toxicology. Format: lecture supplemented by case examples. One field trip to a hazardous chemical waste site. Appropriate for nonmajors seeking basic literacy in environmental and human toxicology. "Gateway course" for students interested in 400- and 600-level toxicology courses.]

VETMI 331 General Parasitology (also BIOMI 331; Undergraduate)
Spring. 2 credits. Prerequisites: zoology or biology; any of the following courses: BIOES 261, 264, 267, 274, 275, 278; BIOG 101, 102, 103, 104, 106, 107, 108, 109, 110, 170, 220, 207: BIOMI 192, 290 or equivalent courses. Letter grades only. D. D. Bowman.
An introduction to the basic animal parasites, stressing systematics, taxonomy, general biology, ecological interactions, and behavior of non-medically important groups. Introduces the major animal parasites, protozoan, nematode, platyhelminth, acanthocephalan, annelid, and arthropod.

[VETMI 404 Pathogenic Bacteriology and Mycology (also BIOMI 404)
Spring. 2 or 3 credits (3 credits with lecture and seminar). Prerequisites: BIOMI 290 and 291. Seminar is required of graduate students and open to undergraduates with permission of instructor. Maximum enrollment 15 students. Letter grades only. Not offered spring 2002. D. P. Debbie.
This is a course in medical microbiology, presenting the major groups of bacterial and mycotic pathogens important to human and veterinary medicine. The course emphasizes infection and disease pathogenesis. Topics include disease causality; interactions of host, pathogen, and environment, including immunity to bacteria and fungi; and principles of antimicrobial therapy and drug resistance. A companion seminar addresses the current and classic literature related to microbial pathophysiology on the cellular and molecular levels.]

VETMI 408 Viruses and Diseases I (also Biological Sciences 408)
Spring. 2 credits. Intended primarily for graduate and undergraduate microbiology majors. Prerequisites: Microbiology 290 and 291 (College of Agriculture and Life Sciences). Recommended: VETMI 315, Genetics 281. Letter grades only. Offered even-numbered years. J. W. Casey.
The course covers basic concepts in virology with emphasis primarily on DNA virus-host interactions, strategies for gene regulation, and mechanisms of pathogenicity. Selected viral infections that result in immune dysfunction and neoplasia are highlighted in the context of approaches to prevent or reduce the severity of diseases.

[VETMI 409 Viruses and Disease II (also BIOMI 409)
Fall. 2 credits. Prerequisites: BIOMI 290 and 291 or permission of instructor. Recommended: BIOMI 408, BIOBM 330–332, BIOBM 432. Offered even-numbered years; next offered fall 2002. G. Whittaker.
This course is complementary to BIOMI 408, Viruses and Disease I, and emphasizes RNA viruses. The course is complete in its own right. As such, completion of BIOMI 408 is not a requirement. The course covers the structure and classification of viruses, entry, genome replication, and virus assembly. Particular emphasis is placed on virus-host cell interactions. Vaccinations, chemotherapy, and evolution of viruses are also discussed.]

VETMI 431 Medical Paras]itology (also BIOMI 417; Undergraduate)
Fall. 2 credits. Prerequisites: zoology or biology; any of the following courses: BIOES 261, 263, 264, 267, 274, 275, 278; BIOG 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 170, 202, 207; BIOMI 192, 290, 398 or equivalent course. Letter grades only. D. D. Bowman.
This course is a systematic study of arthropod, protozoan, and helminth parasites of public health importance, with emphasis on epidemiologic, clinical, and zoonotic aspects of these parasitisms.

VETMI 605 Special Projects in Microbiology (Undergraduate)
Fall, spring. 1–3 credits. By permission of instructor. Prerequisite: a good background in microbiology or immunology. Preferably, students should have background in pathogenic microbiology and immunology. S-U grades only. Microbiology staff.
The course normally provides an opportunity for the student to work in a research laboratory or carry out a special project under supervision.

VETMI 700 The Biology of Animal Viruses (Graduate and Upper-level Undergraduate)
Fall. 2 credits. Letter grades only. Offered odd-numbered years. C. R. Parrish and staff.
This course examines current topics in studies of animal viruses, including some comparisons with plant viruses where similar mechanisms apply. Selected topics are examined in depth, including the structures of viruses and their components, viral nucleic acids and replication strategies, details of the interactions between viruses and their host cell components and metabolism. Other topics include the evolution and selection of viruses, novel approaches to the prevention of virus infection, and methods for antiviral chemotherapy.

[VETMI 701 Pathogenesis of Viral Diseases (also VTMED 619)
Spring. 2 credits. Given during 8-week spring distribution period, January–March. Open to graduate students and advanced undergraduates by permission of instructor. Strongly recommended prerequisite: Immunology. Letter grades only. Generally offered odd-numbered years, but next year offered, still to be determined. Microbiology faculty.
Course content and objectives: the course focuses on the balance between host defense against viral infections and the mechanisms by which viruses perpetuate themselves in human and animal populations. In the process, the mechanisms of cell and animal infection, spread between cells, disease mechanisms, and the roles of the immune response in enhancing and suppressing disease are explored. This includes a systems-based approach exploring the pathogenesis of disease in the CNS, gastrointestinal, hepatic, tegumentary, respiratory, and urogenital systems. The basic principles of virus taxonomy, structure, and replication are included to introduce various viral groups and their special properties. Methods of intervention (vaccination, antiviral drugs) are also covered. Lectures are derived from relevant current literature; Nathanson's *Viral Pathogenesis*, 1997; and Field's *Virology*, third edition, 1996. Relevant materials are placed on reserve in the veterinary library.]

VETMI 702 Molecular Biology and Immunology of Host-Parasite Interactions (Graduate) (also VTMED 620)
Spring. 2 credits. S-U grades optional. Offered even-numbered years. E. J. Pearce.
See description for VTMED 620.

VETMI 705 Advanced Immunology (Graduate) (also Biological Sciences 705)
Spring. 4 credits. Prerequisite: VETMI 315 Basic Immunology or permission of instructor. Letter grades only. Offered even-numbered years. E. Pearce and staff.
Coverage at an advanced level of molecular and cellular immunology.

VETMI 707 Advanced Work in Bacteriology, Virology, and Immunology (Graduate)
Fall, spring. 1–3 credits. By permission of instructor. S-U grades optional. Microbiology staff.
This course is designed primarily for graduate students with a good background in pathogenic microbiology and immunology. It may be elected by veterinary students who are properly prepared.

[VETMI 708 Selected Topics in Animal Virology
Spring, odd-numbered years. 2 credits. Letter grades only. Next offered spring 2003. Microbiology faculty.
Principles of animal virus biology with focus on mechanisms in viral pathogenesis.]

VETMI 712 Seminars in Infection and Immunity
Fall, spring. 1 credit. Required of all graduate students in the department of Microbiology and Immunology and the field of Immunology. S-U grades only. D. Russell.
Invited speakers in immunology and infection biology acquaint students with current advances in the field.

[VETMI 719 Immunology of Infectious Diseases (also Biological Sciences 706) (Graduate)
Spring. 2 credits. Prerequisite: VETMI 315 Basic Immunology or permission of instructor. S-U grades optional. Offered odd-numbered years; next offered spring 2003. E. Y. Denkers and staff.
Coverage at an advanced level of the immunology of diseases caused by selected bacterial, viral, protozoan, and helminthic parasites.]

VETMI 737 Advanced Work in Animal Parasitology (Graduate)
Fall, spring. 1–3 credits. For advanced undergraduate, graduate, and veterinary students. Letter grades only. D. D. Bowman and other faculty.
This course is intended for advanced undergraduate, graduate, and veterinary students with interests in parasitology research.

VETMI 770 Advanced Work in Avian Diseases (Graduate)
Fall, spring. 1–3 credits. By arrangement with instructor. Letter grades only. K. A. Schat.

VETMI 772 Advanced Work in Aquatic Animal Diseases (Graduate)
Fall, spring. 1–3 credits. By arrangement with instructor. S-U grades only. P. R. Bowser.

VETMI 773 Advanced Work in Avian Immunology
Fall, spring. Variable credit. Letter grades only. K. A. Schat.

VETMI 783 Seminars in Parasitology (Graduate)
Fall, spring. 1 credit. Open to veterinary students or graduate students; others by permission of instructor. S-U grades only. D. D. Bowman.
This is a seminar series designed to acquaint students with current research in the field of parasitology. The range of topics is determined, in part, by the interests of those participating and may include such topics as the ecology of parasitism, parasite systematics, wildlife parasitology, and parasitic diseases of plants and animals, including humans.

Molecular Medicine

VETMM 299 Undergraduate Research in Pharmacology
Summer. 3 to 6 credits (3 credits per 120 contact hours). Prerequisites: one year of basic biology (Score of 5 on Biology Advanced Placement Examination of the College Entrance Examination Board or BIOG 100 level.) Letter grades only. R. A. Cerione.
This is a mentored research apprenticeship program, designed to give laboratory experience to qualified unmatriculated high school students (participating in Cornell Summer College) or Cornell underclassmen.

Students are placed in research laboratory with designated project under the direct supervision of a research associate (upper-level graduate student, post-doc, or faculty member). A minimum of 120 hours of laboratory time is expected per three course credits. Students are graded on preparation, participation in laboratory academic life, and appropriate acquisition of techniques. At the end of the six-week session, students are expected to give a brief (15–20 minute) oral presentation of their work, and submit a manuscript in a form suitable for publication. The faculty director of the laboratory has ultimate responsibility for evaluating the student's work and assigning the grade.

VETMM 470 Biophysical Methods (also A&EP 470)
Spring. 3 credits. Prerequisite: permission of instructor. Letter grades only. M. Lindau.
This course is an overview of the diversity of modern biophysical experimental techniques used in the study of biological systems at the cellular and molecular level found in articles published in the *Biophysical* journal. Topics covered include methods that examine both structure and function of biological systems: light microscopy, fluorescence microscopy, Fourier optics and image processing, confocal and multiphoton microscopy, phase contrast, electron microscopy, X-ray diffraction and protein structure determination, multidimensional NMR, spectroscopy, chromophores, calcium measurements, resonance energy transfer, membrane biophysics, electrophysiology, ion channels, action potentials, ligand-gated channels, fluctuation analysis, patch-clamp, molecular biology of ion channels, rapid kinetics, caged compounds, transmitter release, capacitance measurements, amperometry, optical traps, and molecular force measurements. The course format includes assigned literature reviews by the students on specific topics and individual students' presentation of these topics. The course is intended for students of the engineering, physics, chemistry, and biological disciplines who seek an introduction to modern biophysical experimental methods. Due to the interdisciplinary nature of the course, students have diverse backgrounds. A basic knowledge of and interest in physics and mathematics is expected but strong attempts are made to give an intuitive understanding of the mathematics and physics involved. Some knowledge of physical chemistry, molecular and cell biology, or neurobiology is helpful. Depending on individual backgrounds all students find certain aspects of the course easy and other aspects demanding.

[VETMM 610 Cellular and Molecular Pharmacology
Fall. 2 credits. By permission of the instructors. S-U grades optional. Offered even-numbered years; next offered fall 2002. G. A. Weiland and molecular medicine faculty.
This graduate-level course surveys the molecular and cellular aspects of receptor mechanisms, signaling pathways, and effector systems. Topics include drug-receptor interactions; ligand- and voltage-gated ion channels; G protein pathways; growth factor signaling; lipid signaling; calcium; nutrient and nitric oxide signaling; and mechanisms of receptor-mediated effects on neural excitability, electrical pacemakers, muscle contraction, and gene expression.]

VETMM 611 Systems Pharmacology
Spring. 2 credits. By permission of the instructors. S-U grades optional. Offered even-numbered years. G. A. Weiland and molecular medicine faculty.
This graduate-level course surveys system- and organ-related aspects of pharmacology. Topics include drug disposition; pharmacokinetics; autonomic pharmacology; central nervous system pharmacology; pharmacology of inflammation, allergy and platelet function; cardiovascular, gastrointestinal and endocrine pharmacology; and chemotherapy, including antimicrobial agents and cancer chemotherapy.

VETMM 672 Protein Kinetics (also CHEM 672)
Spring. 4 credits. Prerequisite: CHEM 288 or 390, BIOBM 331, or permission of instructor. Letter grades only. B. A. Baird.
This course focuses on protein interactions with ligands and consequent changes in structure and activity. Topics include protein structure and dynamics; thermodynamics and kinetics of ligand binding; steady state and transient enzyme kinetics; enzyme catalysis and regulation; and role of cell membrane receptors in regulating cellular activities.

[VETMM 700 Calcium as a Second Messenger in Cell Activation
Fall. 2 credits. By permission of instructor. Lecture-discussion. S-U grades only. Offered even-numbered years; next offered fall 2002. C. M. S. Fewtrell.
This course focuses on regulation of intracellular calcium and techniques for studying calcium movements and distribution in cells. Topics include calcium channels and exchangers, calcium-binding proteins, and calcium stores; phosphatidylinositol turnover, release of calcium from intracellular stores, and activation of calcium influx; calcium gradients and oscillations; mechanisms of exocytosis and the proteins involved. Each topic is introduced with a lecture followed by discussion of recent papers from the literature.]

[VETMM 701 Organ System Toxicology (also TOX 611)
Fall. 1 credit. For graduate students in environmental toxicology. S-U grades only. Offered even-numbered years; next offered fall 2002. W. S. Schwark.
This is a minicourse on molecular mechanisms involved in chemical toxicity. Specific examples of toxicity in organ systems such as the nervous system, kidney, liver, respiratory tract, and cardiovascular system are considered.]

VETMM 703 Receptor-Ligand Interactions (also BIONB 790–02)
Fall. 2 credits. By permission of the instructors. S-U grades optional. Offered odd-numbered years. R. E. Oswald and G. A. Weiland.
The course covers both the practical and theoretical tools for the study of ligand-receptor interactions, emphasizing the quantitative and physical chemical aspects of receptor theory. Topics discussed are basic methods of radioligand binding assays, including separation and measurement of bound and free ligand; characterization of receptor function; analysis of receptor structure; thermodynamic basis of the binding; methods of analyzing equilibrium binding; equilibrium binding for complex binding mechanisms; and kinetics of simple and complex binding mechanisms.

VETMM 704 CNS Synaptic Transmission
Fall. 2 credits. Maximum enrollment 20 graduate students and undergraduate seniors by permission of instructor. S-U grades optional. Offered odd-numbered years. L. M. Nowak.
This is a survey course in vertebrate central nervous system physiology and pharmacology, and it focuses on mechanisms of neurotransmitter action at the membrane and cellular levels. Roles of selected neurotransmitters in normal and dysfunctional brains are covered. Topics are introduced in lectures and followed up in discussions of recent journal articles.

VETMM 705 Molecular Mechanisms of Receptor-G Protein Coupled Signaling
Fall. 2 credits. S-U grades optional. Offered odd-numbered years. R. A. Cerione.
This course focuses on the mechanisms of action of GTP binding proteins. Several receptor-coupled signaling systems are examined, including adenylyl cyclase, vertebrate vision, phosphatidylinositol lipid turnover, receptor systems regulating various ion channels, and receptors involved in cell growth regulation.

VETMM 706 Growth Factor-Coupled Signaling (also BIOBM 734)
Fall. 0.5 credits. By permission of the instructor. S-U grades optional. Offered odd-numbered years. R. A. Cerione.
The general theme of this course is mitogenic signaling pathways. Receptor tyrosine kinases, src, ras, and ras-regulatory proteins are covered.

VETMM 707 Protein NMR Spectroscopy (also BIOBM 730)
Spring. 2 credits. S-U grades optional. Offered even-numbered years. R. E. Oswald and L. K. Nicholson.

The fundamentals of NMR are presented and students acquire the tools necessary to establish an in-depth understanding of multidimensional, multinuclear NMR experiments. Application of the technique to proteins for assignment of resonances, determination of structure, and characterization of dynamics are presented. Special approaches for applying solution NMR techniques to large proteins are discussed.

[VETMM 708 Lipid Second Messengers
Fall. 2 credits. Students with a general biology background may enroll by permission of instructor. Lecture-discussion. S-U grades optional. Offered even-numbered years; next offered fall 2002. H. A. Brown.
This course covers the biochemical pathways involved in the production of lipid second messengers. These pathways function as essential elements of cellular signal transduction cascades. Topics include pathways of phospholipid synthesis, regulation of major mammalian phospholipases by receptors linked through G-proteins and tyrosine kinase receptors to intracellular cascades, and subsequent metabolism of lipid products. The roles of lipids in regulating cell processes, such as membrane structure, exocytosis, cell cycle, and apoptosis, are topics for discussion following reviews of recent publications. A background in general biochemistry is recommended.]

Special Projects and Research in Pharmacology

Fall, spring, summer. 1–3 credits. By arrangement with instructor. S-U grades optional. Independent study or research. Field of pharmacology faculty.
These courses cover a variety of topics related to the research interests of the faculty.

VETMM 711 The Role of Calcium in Stimulus-Secretion Coupling
C. M. S. Fewtrell.

VETMM 713 Mechanisms of Growth-Factor Action
R. A. Cerione.

VETMM 714 Central Nervous System Neurotransmitters
L. M. Nowak.

VETMM 718 Structure-Function of the Nicotinic Acetylcholine Receptor
R. E. Oswald.

VETMM 730 Graduate Research in Molecular Medicine
Fall, spring, and summer. 1–12 credits. By permission of instructor. S-U grades only. This course is offered by individual faculty members in the Department of Molecular Medicine for graduate students undertaking research toward M.S. or Ph.D. degrees.

Directed Readings in Pharmacology

Fall, spring, and summer. 1–3 credits each topic. By arrangement with instructor. S-U grades optional. Field of pharmacology faculty. Reading and discussions.
These courses are offered to small groups or to individual students.

VETMM 742 Receptor Mechanisms
G. A. Weiland.

VETMM 745 Biochemical Neuropharmacology
G. A. Weiland.

VETMM 747 Amino Acid Neurotransmitters
L. M. Nowak.

VETMM 748 Stimulus-Secretion Coupling
C. M. S. Fewtrell.

VETMM 750 Cell Calcium
C. M. S. Fewtrell.

VETMM 760 Advanced Topics in Pharmacology
Molecular medicine faculty.

Topics in Cancer Cell Biology

VETMM 761 Topics in Cancer Cell Biology
Fall. 1 credit per section. Letter grades only. Section 02 will not be offered 2001–2002. B. Pauli, J. Guan, A. Yen.
Section 1, Cell Adhesion Molecules, Signaling and Cancer is taught by Dr. Jun-in Guan. This section of the topics in cancer cell biology introduces the role of cell adhesion receptors in cancer. The emphasis is on the integrin and cadherin families of cell adhesion molecules and function of integrin, intergrin interactions with cytoskeleton, intracellular signaling pathways in cell-matrix interactions, integrin-mediated signaling in cell migration, proliferation and survival, changes of integrins in tumors and metastasis, structure and function of cadherins, and signaling mechanisms in cell-cell interactions in normal development and cancer.

Section 2, Cell Cycle Analysis is taught by Dr. Andrew Yen. This course presents: (1) a brief historical review of the cell cycle, (2) a summary of cell cycle regulatory processes, and (3) practical methods for cell cycle analysis, including mathematical representations. Topics include: growth control of bacterial cell cycle including chemostats, mammalian cell tissue, cell synchronization, flow cytometry, age-density representation, G1 regulation, labile regulatory protein models, cell transformation, regulation by growth factors and the cytoskeleton, cyclin/E2F/RB regulatory model, practical examples for analysis of cell cycle phase durations, cell cycle phase specific growth factor sensitivity, and timing of RB protein phosphorylation within the cell cycle. The objective of the course is to present graduate students with methods for cell cycle analyses that will be useful in their research.

Population Medicine and Diagnostic Sciences

VTPMD 299 Undergraduate Research in Epidemiology
Summer. 3 credits. Limited to undergraduate students. Letter grades only. Prerequisites are one year of basic biology (Score of 5 on Biology Advanced Placement Examination of the College Entrance Examination Board or BIOG 100 level). Permission of the instructor can be submitted for the prerequisite. J. Scarlett.
This is a mentored research apprenticeship program designed to give laboratory experience in applied epidemiology to qualified unmatriculated high-school students (participating in Cornell Summer College) or Cornell underclassmen. Students are placed in a research laboratory with a designed project under the direct supervision of a research associate (upper-level graduate student, post-doc, or faculty member). A minimum of 120 hours of laboratory time is expected per three course credits. Students are graded on preparation participation in laboratory academic life, and appropriate acquisition of techniques. At the end of the six-week session, students are expected to give a brief (15–20 minute) oral presentation on their work, and submit a manuscript in a form suitable for publication. The faculty director of the laboratory has ultimate responsibility for evaluating each student's work and assigning the grade.

VTPMD 664 Introduction to Epidemiology (Graduate)
Fall. 3 credits. Prerequisites: Statistics and Biometry 601 (College of Agriculture and Life Sciences) may be taken concurrently or by permission of instructor. S-U grades optional. H. N. Erb.
Lectures and discussion deal with the fundamentals of epidemiology. Current topics in epidemiology from the fields of nutrition, infectious and chronic diseases, occupational medicine, and veterinary medicine are reviewed to illustrate the principles and practice of epidemiology, especially of clinical-trial design and infectious-disease epidemiology.

VTPMD 665 Study Designs (Graduate)
Spring. 2 credits. Prerequisites: VTPMD/VETCS 664 and Statistics and Biometry 601 (College of Agriculture and Life Sciences). S-U grades optional. H. O. Mohammed.
Design and interpretation of cross-sectional, case-control, and cohort studies (including controlled clinical trial) are covered. Design issues include sample size, bias, and relative advantages and disadvantages.

The course objectives are (1) to know the difference between different epidemiologic study designs and relative advantages and disadvantages of each; (2) given a problem (usually a field situation), be able to design an appropriate epidemiologic study; (3) be able to effectively analyze and criticize published epidemiologic studies.

The course consists of lectures on the principles of epidemiologic study design and related issues (sample size calculations, validity and precision, and identification and minimizing of bias); basic analysis of epidemiologic data; and discussion of published epidemiologic studies. These studies include observational cohort studies (prospective and retrospective), cross-sectional studies, case-control studies, and hybrid studies (ambidirectional, and other hybrid designs).

VTPMD 666 Advanced Methods in Epidemiology (Graduate)
Fall. 3 credits. Prerequisites: VTPMD/VETCS 665 and Statistics and Biometry 602 (College of Agriculture and Life Sciences). S-U grades optional. M W F 8:45–9:35. Y. T. Grohn.
Concepts introduced in VTPMD 664 and VTPMD 665 are further developed, with emphasis on statistical methods. Topics include interaction, effect modification, stratified analysis, matching and multivariate (logistic regression) methods, survival analysis, and strategies for the analysis of epidemiologic data.

VTPMD 700 Special Projects in Diagnostic Endocrinology
Fall, spring. 1–3 credits. By permission of instructor. Letter grades only. Schanbacher and Lamb.
An independent study course. Students have the opportunity to research a particular topic in diagnostic/clinical endocrinology of animals.

VTPMD 701 Special Projects in Infectious Diseases
Fall, spring. 1–3 credits. By permission of instructor. S-U grades optional. Diagnostic laboratory faculty.
This course provides laboratory experience with attention to specific aspects of infectious disease problems.

VTPMD 702 Special Topics in Infectious Diseases
Fall, spring. 1–3 credits. By permission of instructor. S-U grades optional. Diagnostic laboratory faculty.
The objective of this course is to offer a broad exposure to various aspects of infectious diseases.

VTPMD 703 Doctoral-Level Thesis Research (Graduate)
Fall, spring. 6–9 credits. By permission of instructor. S-U grades only. Diagnostic Laboratory faculty.
Research leading to a Ph.D. degree.

VTPMD 704 Master's-Level Thesis Research (Graduate)
Fall, spring. 1–3 credits. By permission of instructor. S-U grades only. Diagnostic Laboratory faculty.
Research leading to an M.S. degree.

VTPMD 705 Interdisciplinary Approaches to Animal Health
Spring. 3 credits. Minimum enrollment 7 students. S-U grades optional. A. L. Rivas.

[VTPMD 707 Clinical Biostatistics (Graduate)
Spring. 2 credits. For veterinary residents or graduate students. Letter grades only. Offered odd-numbered years; next offered spring 2003. H. N. Erb, Y. T. Grohn, H. O. Mohammed, and J. M. Scarlett.
This course explains the theory behind and interpretation of parametric and nonparametric statistical techniques commonly employed in research/clinical medicine. Students analyze small data sets using a commercial statistical software package.]

VTPMD 708 Epidemiology Seminar Series (Graduate)
Fall, spring. 1 credit. S-U grades only. Epidemiology faculty.
Advanced theoretical and analytical epidemiologic concepts and techniques are discussed.

VTPMD 766 Graduate Research (Graduate)
Fall, spring, summer. Credit and hours TBA. Must be registered in masters or Ph.D. program in epidemiology and permission of the graduate faculty member concerned. S-U grades only. Epidemiology faculty.
This course enables students outside the section of Epidemiology to receive graduate research credits for projects with epidemiological components.

VTPMD 799 Independent Studies in Epidemiology
Fall, spring. 1–3 credits. H. N. Erb, Y. T. Grohn, H. O. Mohammed, and J. M. Scarlett.
The purpose of this course is to investigate an epidemiologic topic with one of the instructors. It provides experience in problem definition, research design, and the analysis of epidemiologic data.

FACULTY ROSTER

Abou-Madi, Noha, D.V.M., U. of Montreal (Canada). Lecturer, Clinical Sciences
Aguirre, Gustavo D., Ph.D., U. of Pennsylvania. Alfred H. Caspary Professor, Clinical Sciences
Ainsworth, Dorothy M., Ph.D., U. of Wisconsin–Madison. Assoc. Prof., Clinical Sciences
Antczak, Douglas F., Ph.D., U. of Cambridge (England). Dorothy Havemeyer McConville Professor of Microbiology and Immunology
Appel, Max J., Ph.D., Cornell U. Prof. Emeritus, Microbiology and Immunology
Appleton, Judith A., Ph.D., U. of Georgia. Prof., Microbiology and Immunology
Baines, Joel, Ph.D., Cornell U. Assoc. Prof., Microbiology and Immunology
Barr, Stephen C., Ph.D., Louisiana State U. Assoc. Prof., Clinical Sciences
Baustian, Mark D., M.S., Portland State U. Lecturer, Biomedical Sciences
Bell, Robin G., Ph.D., John Curtin School (Australia). Prof., Microbiology and Immunology
Beyenbach, Klaus, Ph.D., Washington State U. Prof., Biomedical Sciences
Bezuidenhout, Abraham J., D.V.M., U. of Pretoria. Senior Lecturer, Biomedical Sciences
Bliss, Stuart, D.V.M., Cornell U. Instructor, Clinical Sciences
Bloom, Stephen E., Ph.D., Penn State U. Prof., Microbiology and Immunology
Blue, Julia T., D.V.M., OK State. Ph.D., U. of Pennsylvania. Assoc. Prof., Population Medicine and Diagnostic Services
Bowman, Dwight D., Ph.D., Tulane U. Assoc. Prof., Microbiology and Immunology
Bowser, Paul R., Ph.D., Auburn U. Prof., Microbiology and Immunology
Brown, H. Alex, Ph.D., U. of North Carolina–Chapel Hill. Asst. Prof., Molecular Medicine
Butler, Emily C., D.V.M., Cornell U. Instructor, Clinical Sciences
Casarett, Alison P., Ph.D., U. of Rochester. Prof. Emeritus, Biomedical Sciences
Casey, James W., Ph.D., U. of Chicago. Assoc. Prof., Microbiology and Immunology
Center, Sharon A., D.V.M., U. of California–Davis. Prof., Clinical Sciences
Cerione, Richard A., Ph.D., Rutgers U. Prof., Molecular Medicine
Chang, Yung Fu, Ph.D., Texas A&M. Assoc. Prof., Population Medicine and Diagnostic Sciences
Clark, Theodore G., Ph.D., SUNY–Stony Brook. Asst. Prof., Microbiology and Immunology
Collins, Ruth N., Ph.D., Imperial Cancer Research Center. Asst. Prof., Molecular Medicine
Cook, Vanessa L., Veterinary MB, Cambridge U. (U.K.). Lecturer, Clinical Sciences
Cooper, Barry J., Ph.D., U. of Sydney (Australia). Prof., Biomedical Sciences/Administration
Debbie, Dorothy P., Ph.D., Stanford U. Lecturer, Microbiology and Immunology
Denkers, Eric Y., Ph.D., U. of Wisconsin–Madison. Asst. Prof., Microbiology and Immunology
deLahunta, Alexander, Ph.D., Cornell U. James Law Professor of Veterinary Anatomy, Biomedical Sciences
Dietert, Rodney R., Ph.D., U. of Texas–Austin. Prof., Microbiology and Immunology
Divers, Thomas J., D.V.M., U. of Georgia. Prof, Clinical Sciences
Dobson, Alan, Ph.D., U. of Cambridge (U.K.). Prof. Emeritus, Biomedical Sciences
Dubovi, Edward J., Ph.D., U. of Pittsburgh. Assoc. Prof., Population Medicine and Diagnostic Sciences
Ducharme, Normand G., D.V.M., U. of Montreal (Canada). Prof., Clinical Sciences
Dykes, Nathan L., D.V.M., Cornell U. Lecturer, Clinical Sciences
Erb, Hollis N., Ph.D., U. of Guelph (Canada). Prof., Population Medicine and Diagnostic Sciences
Evans, Howard E., Ph.D., Cornell U. Prof. Emeritus, Veterinary and Comparative Anatomy, Biomedical Sciences
Farnum, Cornelia, Ph.D., U. of Wisconsin–Madison. Prof., Biomedical Sciences
Fewtrell, Clare, D.Phil., U. of Oxford (England). Assoc. Prof., Molecular Medicine
Flanders, James A., D.V.M., U. of California–Davis. Assoc. Prof., Clinical Sciences
Fortier, Lisa A., D.V.M., Colorado State U. Asst. Prof., Molecular Medicine
Fortune, Joanne E., Ph.D., Cornell U. Prof., Biomedical Sciences
Fox, Francis H., D.V.M., Cornell U. Prof. Emeritus, Clinical Sciences
French, Tracy W., D.V.M., Purdue U. Assoc. Prof., Population Medicine and Diagnostic Sciences
Fubini, Susan L., D.V.M., U. of Georgia. Prof., Clinical Sciences
Gasteiger, Edgar L., Ph.D., U. of Minnesota. Prof. Emeritus, Biomedical Sciences
Gilbert, Robert O., B.V.Sc., U. of Pretoria (South Africa). Assoc. Prof., Clinical Sciences
Gilmour, Robert F., Jr., Ph.D., SUNY–Upstate Medical Center. Prof., Biomedical Sciences
Gleed, Robin D., B.V.Sc., U. of Liverpool (England). Assoc. Prof., Clinical Sciences
Grohn, Yrjo T., Ph.D., College of Veterinary Medicine, Helsinki (Finland). Prof., Population Medicine and Diagnostic Sciences
Guan, Jun-Lin, Ph.D., U. of California–San Diego. Assoc. Prof., Molecular Medicine
Guard, Charles L. III, Ph.D., Case Western Reserve U. Assoc. Prof., Population Medicine and Diagnostic Sciences
Habel, Robert E., D.V.M., M.Sc., M.V.D., Cornell U. Prof. Emeritus, Anatomy
Hackett, Richard P., Jr., D.V.M., Ohio State U. Prof., Clinical Sciences
Hansel, William, Ph.D., Cornell U. Liberty Hyde Bailey Prof. Emeritus, Biomedical Sciences
Harvey, H. Jay, D.V.M., Kansas State U. Assoc. Prof., Clinical Sciences
Haussler, Kevin K., Ph.D., U. of California at Davis. Lecturer, Biomedical Sciences
Henion, John D., Ph.D., SUNY at Albany. Prof., Analytical Toxicology, Population Medicine and Diagnostic Sciences
Hermanson, John W., Ph.D., U. of Florida. Assoc. Prof., Biomedical Sciences
Hill, Jonathan R., BVSc (Hons), U. of Queensland (Australia). Asst. Prof., Clinical Sciences
Hornbuckle, William E., D.V.M., Oklahoma State U. Prof., Clinical Sciences
Houpt, Katherine A., Ph.D., U. of Pennsylvania. Prof., Biomedical Sciences
Houpt, T. Richard, Ph.D., U. of Pennsylvania. Prof., Biomedical Sciences
Huxtable, Clive R., Ph.D., U. of Sydney. Prof., Biomedical Sciences
Irby, Nita L., D.V.M., U. of Georgia. Lecturer, Clinical Sciences
Kallfelz, Francis A., Ph.D., Cornell U. James Law Prof. of Medicine, Clinical Sciences
Kern, Thomas J., D.V.M., U. of Missouri. Assoc. Prof., Clinical Sciences
King, John M., Ph.D., Cornell U. Prof. Emeritus, Biomedical Sciences
Kollias, George V., Ph.D., U. of California–Davis. Jay D. Hyman Prof., Clinical Sciences
Kotlikoff, Michael I., V.M.D., Ph.D., U. of California-Davis. Prof., Biomedical Sciences
Krook, Lennart P., Ph.D., Royal Veterinary College at Stockholm (Sweden). Emeritus Prof., Pathology
Lengemann, Fredrick W., Ph.D., U. of Wisconsin. Prof. Emeritus, Biomedical Sciences
Levine, Roy A., Ph.D., Indiana U. Assoc. Prof., Molecular Medicine
Lewis, Robert M., D.V.M., Washington State U. Prof. Emeritus, Biomedical Sciences

Loew, Ellis R., Ph.D., U. of California-Los Angeles. Prof., Biomedical Sciences
Ludders, John W., D.V.M., Washington State U. Assoc. Prof., Clinical Sciences
Lust, George, Ph.D., Cornell U. Prof., Microbiology and Immunology
MacLeod, James N., V.M.D., Ph.D., U. of Pennsylvania. Assoc. Prof., Biomedical Sciences
Marsh, James A., Ph.D., Northwestern U. Prof., Microbiology and Immunology
Maylin, George A., Ph.D., Cornell U. Assoc. Prof., Population Medicine and Diagnostic Sciences
Maza, Paul S., D.V.M., Ross U. Lecturer, Biomedical Sciences
McDonough, Patrick, Ph.D., Cornell U. Asst. Prof., Population Medicine and Diagnostic Sciences
McDonough, Sean P., Ph.D., U. of California. Asst. Prof., Biomedical Sciences
McEntee, Kenneth, D.V.M., Cornell U. Prof. Emertius, Biomedical Sciences
McEntee, Margaret C., D.V.M., Cornell U. Assoc. Prof., Clinical Sciences
McFadden, Carol H., Ph.D., Cornell U. Senior Lecturer, Biomedical Sciences
McGregor, Douglas D., D.Phil., U. of Oxford (England). Prof., Microbiology and Immunology
Meyers-Wallen, Vicki N., Ph.D., U. of Pennsylvania. Assoc. Prof., Biomedical Sciences
Miller, William H., Jr., V.M.D., U. of Pennsylvania. Prof., Clinical Sciences
Minor, Ronald R., Ph.D., U. of Pennsylvania. Prof., Biomedical Sciences
Mizer, Linda, Ph.D., Ohio State U. Senior Lecturer, Biomedical Sciences
Mohammed, Hussni, O., Ph.D., U. of California–Davis. Prof., Population Medicine and Diagnostic Sciences
Moise, N. Sydney, D.V.M., Texas A&M. Prof., Clinical Sciences
Moon, Paula, D.V.M., Ohio State U. Asst. Prof., Clinical Sciences
Naqi, Syed A., Ph.D., Texas A&M. Prof., Microbiology and Immunology
Nathanielsz, Peter W., M.D., U. of Cambridge (England). James Law Prof. of Physiology, Biomedical Sciences
Nikitin, Alexander, Ph.D., The Acad. Pavloc First Medical Institute. Asst. Prof., Biomedical Sciences
Nixon, Alan J., B.V.Sc., U. of Sydney (Australia). Prof., Clinical Sciences
Noden, Drew M., Ph.D., Washington U. Prof., Biomedical Sciences
Noronha, Fernando M., D.V.M., U. of Lisbon (Portugal). Prof. Emeritus, Microbiology and Immunology
Nowak, Linda M., Ph.D., U. of Michigan. Assoc. Prof., Molecular Medicine
Oswald, Robert E., Ph.D., Vanderbilt U. Prof., Molecular Medicine
Page, Rodney L., D.V.M., Colorado State U. Prof., Clinical Sciences
Parrish, Colin R., Ph.D., Cornell U. Assoc. Prof., Microbiology and Immunology
Pauli, Bendicht U., D.V.M., Ph.D., U. of Bern (Switzerland). Prof., Molecular Medicine
Pearce, Edward, J., Ph.D., National Institute for Medical Research (England). Assoc. Prof., Microbiology and Immunology
Phemister, Robert D., Ph.D., Colorado State U. Prof., Pathology
Quaroni, Andrea, Ph.D., U. of Pavia (Italy). Prof. Emeritus, Biomedical Sciences
Randolph, John F., D.V.M., Cornell U. Prof., Clinical Sciences
Rassnick, Kenneth M., D.V.M., Cornell U. Asst. Prof., Clinical Sciences
Rawson, Richard, Ph.D., Kansas State U. Lecturer, Biomedical Sciences
Ray, Jharna, Ph.D., U. of Calcutta (India). Asst. Prof., Biomedical Sciences
Reimers, Thomas J., Ph.D., U. of Illinois. Prof. Emeritus, Population Medicine and Diagnostic Sciences
Riis, Ronald C., D.V.M., U. of Minnesota. Assoc. Prof., Clinical Sciences
Roberson, Mark S., Ph.D., U. of Nebraska at Lincoln. Asst. Prof., Biomedical Sciences
Russell, David G., Ph.D., Imperial College, London U. (England). Prof., Microbiology and Immunology
Sack, Wolfgang O., D.V.M., Ph.D., U. of Edinburgh. Prof. Emeritus., Anatomy
Scarlett, Janet M., Ph.D., U. of Minnesota. Assoc. Prof., Population Medicine and Diagnostic Sciences
Schat, Karel A., Ph.D., Cornell U. Prof., Microbiology and Immunology
Schlafer, Donald H., Ph.D., U. of Georgia. Prof., Biomedical Sciences
Schukken, Ynte H., Ph.D., U. of Utrecht. Assoc. Prof., Population Medicine and Diagnostic Sciences
Schwark, Wayne S., Ph.D., U. of Ottawa (Canada). Prof., Molecular Medicine
Schweizer, Christine, D.V.M., Cornell U. Lecturer, Clinical Sciences
Scidmore, Marci, Ph.D., Princeton U. Asst. Prof., Microbiology and Immunology
Scott, Danny W., D.V.M., U. of California at Davis. Prof., Clinical Sciences
Scott, Fredric W., Ph.D., Cornell U. Emeritus Prof., Microbiology and Immunology
Scrivani, Peter V., D.V.M., Cornell U. Lecturer, Clinical Sciences
Sellers, Alvin F., V.M.D., Ph.D., U. of Minnesota. Prof. Emeritus, Biomedical Sciences
Sharp, Geoffrey W. G., D.Sc., U. of London (England). Prof., Molecular Medicine
Shin, Sang J., D.V.M., Seoul National U. (Korea). Assoc. Prof., Population Medicine and Diagnostic Sciences
Short, Charles E., Ph.D., U. of Turku (Finland). Prof. Emeritus, Clinical Sciences
Simpson, Kenneth W., Ph.D., U. of Leicester (England). Asst. Prof., Clinical Sciences
Smith, Donald F., D.V.M., U. of Guelph (Canada). Prof., Clinical Sciences
Smith, Mary C., D.V.M., Cornell U. Assoc. Prof., Population Medicine and Diagnostic Sciences
Suarez, Susan S., Ph.D., U. of Virginia. Assoc. Prof., Biomedical Sciences
Summers, Brian A., Ph.D., Cornell U. Prof., Biomedical Sciences
Tapper, Daniel N., V.M.D., U. of Pennsylvania, Ph.D., Cornell U. Emeritus Prof., Physiology/Biomedical Sciences
Tennant, Bud C., D.V.M., U. of California at Davis. James Law Professor of Comparative Medicine, Clinical Sciences
Todhunter, Rory J., Ph.D., Cornell U. Assoc. Prof., Clinical Sciences
Trotter, Eric J., D.V.M., U. of Illinois. Assoc. Prof., Clinical Sciences
Volkmann, Dietrich H., VBSc, U. of Pretoria (S. Africa). Assoc. prof., Clinical Sciences
Warnick, Lorin D., Ph.D., Cornell U. Asst. Prof., Population Medicine and Diagnostic Sciences
Wasserman, Robert H., Ph.D., Cornell U. James Law Prof. Emeritus Physiology/Biomedical Sciences
Weiland, Gregory A., Ph.D., U. of California–San Diego. Assoc. Prof., Molecular Medicine
White, Maurice E., D.V.M., Cornell U. Prof., Population Medicine and Diagnostic Sciences
Whittaker, Gary R., Ph.D., U. of Leeds (England). Asst. Prof., Microbiology and Immunology
Winand, Nena J., D.V.M., Iowa State U., Ph.D., Cornell U. Asst. Prof., Molecular Medicine
Woodie, James B., D.V.M., N. Carolina State U. Asst. Prof., Clinical Sciences
Wootton, John F., Ph.D., Cornell U. Prof., Biomedical Sciences
Yen, Andrew, Ph.D., Cornell U. Prof., Biomedical Sciences

COLLEGE OF ARTS AND SCIENCES

PROGRAM OF STUDY

Introduction

The College of Arts and Sciences—composed of departments in the humanities and the arts, the basic sciences, mathematics and computer science, and the social sciences and history—is a community of about 4,100 undergraduates and 600 faculty members. The college values intellectual breadth and rigor, individual choice and responsibility, imaginative courses of study, and development of critical thinking and writing. The college is also a graduate school and research center attracting faculty whose research and scholarly and creative work require first-rate academic facilities and who bring to all their students the profound questioning and the current ideas of contemporary scholarship. Finally, the college exists within a university of several other colleges and of about 19,000 students and 1,500 faculty members. This wider community provides depth and diversity of applied and professional studies beyond what one undergraduate college alone can offer. Students may draw upon the knowledge and facilities of the other undergraduate colleges at Cornell to supplement their studies. Abundant variety and outstanding quality in many fields, including interdisciplinary fields, give the college and the university its distinctive character.

The richness of the college's curriculum is extraordinary; there is no course that all students must take, and there are nearly 2,000 from which they may choose. By choosing courses each semester, students design their own education. They strike a balance between developing known interests and exploring new subjects. They sharpen their verbal and quantitative skills. They also come to understand more thoroughly the Western tradition and learn something about the non-Western world and its peoples. An education in the liberal arts and sciences means honing one's critical capacities, learning about oneself in nature and culture, and gaining real experience with views of the world radically unlike one's own. All this is highly individual, and the college relies on each student and faculty adviser to design a sensible, challenging, and appropriate course of study.

Yet the faculty believes that each student's education should have certain common qualities. These include familiarity with several different ways of knowing that are reflected in clusters of disciplines in the natural sciences, the social sciences, and the humanities and the arts. In addition to these general areas of knowledge, students study foreign languages, acquire effective writing and quantitative skills, and concentrate on one particular field to develop the powers of imaginative and critical thinking as fully as possible. To accomplish these objectives, the college has certain requirements for graduation.

The College of Arts and Sciences awards one undergraduate degree, the Bachelor of Arts degree

Summary of Requirements

1) First-Year Writing Seminars: two courses. (See John S. Knight Institute for Writing in the Disciplines p. 563.)
2) Foreign language: proficiency in one language or qualification in two; zero to four courses, depending on background.
3) Distribution: nine courses, three of which are satisfied with a major in humanities or social sciences and four of which are satisfied with a major in sciences.
4) Breadth: two courses (may be among courses for distribution, major, or electives).
5) Major.
6) Electives: four or five courses (at least 15 credits) not used to fulfill other requirements and not in the major field.
7) Residence: eight full-time semesters, unless a student can successfully complete all other requirements in fewer than eight semesters and meet the additional criteria to accelerate graduation. (See below under "Acceleration.")
8) 34 courses: a three- or four-credit course counts as one course. A two-credit course counts as half a course; a one-credit course does not normally count toward the requirement; a six-credit language course counts as one and one-half courses. (See below under "Courses and Credits" for some one-credit courses in music, dance, and theatre performance that can be cumulated to count as one-half course and for counting other five and six credit courses.
9) Credits: a total of 120 academic credits, of which 100 must be taken in the College of Arts and Sciences. (Note "Non-credit courses below.")
10) Physical education: completion of the university requirement (passing a swim test and two one-credit non-academic courses). Please note that physical education credit does not count toward graduation or toward the 12-credit minimum required for good academic standing each semester.
11) Application to graduate. (See below under "Graduation.")

Explanation of Requirements

Foreign Language Requirement

The faculty considers competence in a foreign language essential for an educated person. Studying language other than one's own helps students understand the problematics of language, our fundamental intellectual tool, and more fully opens another culture for exploration. The sooner a student acquires competence, the more useful it will be. Hence, work toward the foreign language requirement should be undertaken in the first two years. Courses in foreign languages and/or literature are taught in the College of Arts and Sciences by the following departments: Africana Studies and Research Center, Asian Studies, Classics, German Studies, Linguistics, Near Eastern Studies, Romance Studies, and Russian Literature.

The language requirement may be satisfied in one of two ways:

1) by attaining *proficiency* (competence at the intermediate level) in one language

or

2) by attaining *qualification* (mastery of an introductory sequence) in two languages.

Proficiency

Proficiency may be attained in languages by passing an intermediate (usually 200-level) Cornell course (or Chinese or Japanese 161). Introductory courses in some less commonly taught languages are taught at the 200-level or above; (for example, Ancient Egyptian and Welsh); these do not confer proficiency. Proficiency can also be earned by examination. A score of 4 or 5 on an AP *literature* exam in French, Italian, or Spanish earns proficiency and three credits. A score of 4 or 5 on the AP exam in German earns proficiency and three credits. Students with those scores should also take the Cornell Advanced Standing Examination (CASE), given during orientation week, to see if they can earn three additional credits. A score of 4 or 5 on an AP *language* exam earns three credits but *does not* carry with it proficiency. However, a student who received a score of 4 or 5 on an AP language exam can earn proficiency and an additional three credits by scoring high enough on the CASE. Students with appropriate scores on Cornell Language Placement tests or SAT II examinations are also eligible to take the CASE (see chart below). Native speakers and writers of a language other than English may earn proficiency and six credits by taking the CASE or an individual exam (if no CASE is available).

Qualification

Qualification may be attained in any of the following ways:

1) Three years of high school study in any one language gives qualification in that language. No demonstration of competence is necessary. Note, however, that this route to qualification does not guarantee entrance into an intermediate level course. Students who want to continue studying the language must be placed in the appropriate course through an examination. Being placed below the intermediate level does not cancel the qualification.
2) Passing the requisite Cornell course, the last course of the introductory sequence.

   Note: Except in the case of Sanskrit, completion of language sequences 131–132 does not constitute qualification.

3) Achieving the requisitie score (see chart) on the SAT II taken in high school or a score of 56 or higher on the appropriate Cornell LP (Language Placement) test.

   Students may earn a score of 56 on the placement test at the end of a course numbered 122 (second semester of the introductory sequence) and consequently attain *qualification* without taking 123, the third semester of the introductory sequence.

4) By departmental or (when no placement test is available) individual examination at Cornell (if a qualified examiner is here).

Placement in Language Courses and Advanced Placement Credit

Placement into language courses and advanced placement credit are separate results of examinations.

Placement

Entering students who have had two or more years of high school study in a language, who have been awarded credit for language work at another college or university, or who are native speakers, bilingual, or have spoken the language at home, may enroll in a course in the same language only after being placed by examination. The placement exam may have been taken in high school (SAT II, taken after the last course, or AP, if the score was 4 or 5) or at Cornell (LP test). Students may, but need not, retake a language test if a year or more has passed since last taking it. Being placed into the first course at an intermediate level course does not earn credit toward the degree. Degree credit is earned only for demonstrated mastery of work equivalent to the first course at an intermediate level at Cornell, and placement into the second intermediate course.

Placement Tests and Advanced Placement Credit

1) The following language placement and advanced standing tests are scheduled at the beginning of each semester: Chinese, Japanese, and Korean (schedule available from the Department of Asian Studies, 388 Rockefeller Hall); German (schedule available from the Department of German Studies, 183 Goldwin Smith Hall); French, Italian, and Spanish (schedule available from the Department of Romance Studies, 303 Morrill Hall); and Russian (schedule available from the Department of Russian Literature, 226 Morrill Hall). Please note that the advanced standing examination in French, German, Italian, Russian, and Spanish, is called the CASE (Cornell Advanced Standing Examination). Eligibility for the CASE may be determined from the placement tables below. In Russian only, *all* students seeking placement take the CASE.

   Native speakers of Spanish who have completed their secondary education in a Spanish-speaking country do not take the CASE. For these students, the Spanish program offers a walk-in service, the Native Language Accreditation for Spanish, in the third week of September and the first week of February. Students interested in this service should contact Eleanor Dozier in Morrill Hall. Spanish-English bilinguals who do not fit the definition of "native speakers," and whose test scores make them eligible, should take the CASE.

French

Placement Tests LPF	*SAT II*	*Language Courses*	*Literature Courses*
below 37	below 410	121	
37–44	410–480	112 or 122	
45–55	490–590	123	
56–64	600–680	206 209 H ADM 266	201
60 and above	640 and above		220, 221, 222
65 and above	690 and above		CASE required for placement in language.
AP 4 or 5 in language, 3 credits.			CASE required for placement in language.
AP 4 or 5 in literature, 3 credits and proficiency.			CASE required for placement in language.

German

Placement Tests LPG	*SAT II*	*Language Courses*	*Literature Courses*
below 37	below 370	121	
37–44	370–450	122	
45–55	460–570	123	
56–64	580–670	200 205	200
65 and above	680 and above		CASE required for placement
AP 4 or 5, 3 credits.			CASE required for placement

Italian

Placement Tests LPI	*SAT II*	*Language Courses*	*Literature Courses*
below 37	below 370	121	
37–44	370–450	122	
45–55	460–580	123	
56–64	590–680	209	214, 215, 216, or 217
65 and above	690 and above		CASE recommended for placement*
AP 4 or 5 in language, 3 credits.			CASE recommended for placement*
AP 4 or 5 in literature, 3 credits and proficiency.			CASE recommended for placement*

* Students who have a score of 65 of higher on the LPI, or 690 or higher on the SAT II, or an AP score of 4 or 5 may enroll in Italian 201 or 203 without taking the CASE.

Spanish

Placement Tests LPS	*SAT II*	*Language Courses*	*Literature Courses*
below 37	below 370	121	
37–44	370–450	112 122	
45–55	460–580	123	
56–64	590–680	200 209 207	218
65 and above	690 and above		CASE recommended for placement*
AP 4 or 5 in language, 3 credits.			CASE recommended for placement*
AP 4 or 5 in literature, 3 credits and proficiency.			CASE recommended for placement*

*Students who have a score of 65 of higher on the LPS, or 690 or higher on the SAT II, or an AP score of 4 or 5 may enroll in Spanish 200, 207, or 209 without taking the CASE.

2) Arabic: departmental examination, Department of Near Eastern Studies, 360 Rockefeller Hall.

3) Greek, ancient and modern: departmental examination, Department of Classics, 120 Goldwin Smith Hall.

4) Hebrew: departmental examination, Department of Near Eastern Studies, 360 Rockefeller Hall.

5) Latin: departmental examination, Department of Classics, 120 Goldwin Smith Hall.

Substitutions to the Language Requirement

Outright waivers of the requirement are never granted. However, rarely and as appropriate, alternatives to language acquisition are approved. Legitimate requests for substitutions require evidence of inability to learn foreign languages in a classroom setting. Most students provide documentation of learning disabilities relating to foreign language acquisition (e.g., an auditory processing problem) to Student Disability Services, 420 Computing and Communications Center, 255–4545. Other students who may never have been tested for a disability reveal it through repeated and dedicated but vain attempts in formal language courses. A poor grade in a Cornell introductory language course or taking the LP exam repeatedly and unsuccessfully is not adequate evidence.

Students who wish to request a substitution for the normal requirement should meet with Dean Walbridge, Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall. If Dean Walbridge determines that the request has merit, the student meets with the Language Substitution Review Committee. This committee makes the final decision for or against a substitution. If a substitution is allowed, the committee works with the student to select substitute courses.

Distribution Requirements

In satisfying the distribution requirements, students become acquainted with a broad range of subject matter and points of view among disciplines in the college and explore areas that may be entirely new to them. Or, to look at it the other way, as first-year students explore subjects that interest them, they satisfy some of the distribution requirements along the way. Consequently, first-year students should take courses to prepare for possible majors and to explore subjects new to them, and take no course only in order to satisfy a distribution requirement. Although, students may complete the requirements over eight semesters, they can take advanced courses in subjects they (perhaps unexpectedly) find intriguing only if they have completed the introductory prerequisites. Consequently, students should not postpone satisfying distribution requirements until the last semesters. Once sure of a major, students should consider which distribution requirements are yet unfilled and how to fulfill them with courses that complement their overall program.

Students must take a total of nine courses of three or more credits each for the distribution requirements: four courses from Groups I and II below, at least two of which are from Group I and at least one of which is from Group II (for example, one chemistry, one physics, one geology, and one mathematics); five courses from Groups III and IV below, with at least two in each group and two in the same department (for example, one course in sociology, one in history, one in history of art, and two in theater arts). Courses that satisfy distribution requirements are listed and described in their departmental sections. The Roman numeral—I, II, III, or IV indicates which group they satisfy. If there is no numeral at all, the course satisfies no distribution requirement. Courses in the major may be applied to the distribution requirements (unless prohibited by one of the restrictions noted under restrictions on applying AP credit, transfer credit, and Cornell courses to distribution requirements).

I. Physical and Biological Sciences

In fulfilling the four courses in science and quantitative reasoning, students must take at least two science courses. At least one of these must be from the primary list of courses in science departments in the College of Arts and Sciences:

Primary list:

Anthropology:
- 275 Human Biology and Evolution
- 371 Human Paleontology
- 474 Lab and Field Methods in Human Biology

Astronomy

Chemistry

Computer Science
- 321 Numerical Methods in Computational Molecular Biology

Earth and Atmospheric Sciences, *except* 150, 250

Physics

Psychology
- 111 Brain, Mind, and Behavior
- 322 Hormones and Behavior
- 324 Biopsychology Laboratory
- 332 Biopsychology of Learning and Memory
- 396 Introduction to Sensory Sytems
- 424 Neuroethology
- 429 Olfaction and Taste: Structure and Function
- 431 Effects of Aging on Sensory and Perception Systems
- 492 Sensory Function

Biological Sciences: While there are several single-semester biology courses particularly suitable for distribution, students must note that introductory biology can count for distribution only when completed as a two-semester sequence: 109–110, 105–106, or 101 and 103 plus 102 and 104, or 107–108, or a combination of the first term of one sequence and the second term of another. Students may select additional science courses from the following **supplementary list:**

Animal Science:
- 100 Domestic Animal Biology I
- 150 Domestic Animal Biology II
- 212 Animal Nutrition

Anthropology:
- 101 Introduction to Anthropology
- 208 The Evolution of Human Mating
- 390 Primate Behavior and Ecology

Applied and Engineering Physics:
- 110 The Laser and its Applications in Science, Technology, and Medicine

Electrical Engineering:
- 430 Lasers and Optical Electronics

Engineering:
- 110 The Laser and its Applications in Science, Technology, and Medicine

Entomology:
- 212 Insect Biology

Food:
- 200 Introductory Food Science

Materials Science and Engineering:
- 281 The Substance of Civilization

Natural Resources:
- 201 Environmental Conservation
- 210 Introductory Field Biology
- 301 Forest Ecology

Nutritional Science:
- 115 Nutrition and Health

Psychology:
- 223 Introduction to Biopsychology
- 326 Evolution of Human Behavior

II. Quantitative and formal reasoning

In completing four courses in science and quantitative reasoning, students must take at least one of the following courses:

Biometry:
- 261 Statistical Methods

City and Regional Planning:
- 321 Introduction to Quantitative Methods

Computer Science:
- 100 Introduction to Computer Programming
- 211 Computers and Programming
- 312 Structure and Interpretation of Computer Programs
- 486 Applied Logic

Economics:
- 319 Introduction to Statistics and Probability
- 320 Introduction to Econometrics
- 321 Applied Econometrics

Industrial & Labor Relations:
- 210 Statistical Reasoning I
- 211 Statistical Reasoning II

Linguistics:
- 216 Mathematical Linguistics

Mathematics: all courses *except* 101 and 109

Operations Research & Industrial Engineering:
- 115 Engineering Applications of OR&IE

Philosophy:
- 231 Introduction to Deductive Logic
- 331 Deductive Logic
- 431 Mathematical Logic
- 432 Topics in Logic
- 434 The Foundations of Mathematics
- 436 Intensional Logic

Physics:
- 205 Reasoning about Luck
- 209 Relativity and Chaos
- 210 Random Classical & Quantum Physics

Psychology:
- 350 Statistics and Research Design

Sociology:
- 301 Evaluating Statistical Evidence

If students choose two courses from this list to satisfy part of the distribution requirement, those two courses may not have significant overlap. For example, students may not choose two beginning courses in statistics.

III. Social sciences and history

The following departments are included in Group III, social sciences and history. Most (although not all) courses in these departments satisfy distribution in this group. Students should consult the departmental listings for options that are noted as satisfying Group III.

Anthropology
Economics
Government
History
Linguistics
Psychology
Sociology

In addition, interdisciplinary departments and programs offer courses in Group III. Again, students should consult the departmental and program listings and note which courses satisfy Group III.

Africana Studies
American Studies
Archaeology
Asian Studies
Asian American Studies
Biology and Society
Cognitive Studies
Near Eastern Studies
Religious Studies
Science and Technology Studies
Women's Studies

Finally, CRP 100 and 101 and ENGRG 250 and 298 satisfy distribution in Group III.

IV. Humanities and the arts

The following departments are included in Group IV, humanities (literature and philosophy) and the arts. While language and logic courses do not count for distribution in this group, most (although not all) other courses in these departments do. Students should consult the departmental listings for options that are noted as satisfying Group IV.

Asian Studies
Classics
Comparative Literature
English
German Studies
History of Art
Music

(One course must be in music history, culture, or theory. If a student chooses to satisfy part of the distribution requirement with more than one music course, an acceptable sequence may include four credits (two half courses) in musical performance, organizations, or ensembles combined with theory, history, and culture courses. Students may count performance credits as only one course toward distribution.)

Philosophy
Romance Studies (French, Italian, and Spanish Literature)
Russian Literature
Theatre, Film, and Dance

In addition, interdisciplinary departments and programs offer courses in Group IV. Again, students should consult the departmental and program listings to find which courses satisfy Group IV.

Africana Studies
American Studies
Anthropology
Archaeology
Asian American Studies
Biology and Society
Near Eastern Studies
Religious Studies
Science and Technology Studies
Women's Studies

Restrictions on Applying AP Courses and Credit from Other Institutions to the Distribution Requirements

Students may apply up to two courses of approved advanced placement or transfer credit towards distribution requirements in Groups I and II (physical/biological sciences and quantitative/formal reasoning), as long as they take at least one course from the primary list in an Arts and Sciences science department at Cornell. Transfer credit applied to distribution in Group II (quantitative/formal reasoning) must be in mathematics, statistics, or computer science; it may not be in other quantitative subjects. Courses taken at other institutions in mathematics or computer science must be approved for transfer and distribution credit by the Departments of Mathematics or Computer Science respectively. Statistics courses taken at other institutions in social science departments must be approved by the relevant department in Arts and Sciences (e.g., psychology or sociology); statistics courses taken in mathematics or statistics departments must be approved by the Department of Mathematics.

Students may apply no advanced placement or transfer credit from other institutions toward satisfaction of the distribution requirements in Groups III and IV (social sciences/history and humantities/arts).

Students who transfer to the college from another institution or who enter through the Mid-Year Freshman Program are under the above rules for advanced placement credit, but are eligible to have credit for post high school coursework taken during regular semesters (not summer school) at their previous institution count towards all distribution requirements. Transfer students receive a detailed credit evaluation when they are accepted for admission.

Restrictions on Applying Cornell Courses to the Distribution Requirement

1) First-Year Writing Seminars may not count toward any distribution requirement.
2) No single course may satisfy more than one distribution requirement.
3) Students may count courses in their major towards distribution. However, courses offered or cross-listed by their major department may not be counted toward any distribution category beyond the usual category of the major department itself. For example, a history major may not count a course cross-listed between history and a literature department toward distribution in the humanities.

Breadth Requirements

Students must include in their undergraduate curricula at least one Arts and Sciences course that focuses on an area or a people other than those of the United States, Canada, or Europe and one course that focuses on an historical period before the twentieth century. Courses that satisfy the geographic breadth requirement are marked with an @ when described in this catalog. Courses that satisfy the historical breadth requirement are marked with a #. Many courses satisfy both requirements, and students may in fact use the same course to satisfy both. Students may use courses satisfying distribution, major, or elective—but not writing—requirements in satisfaction of either of the breadth requirements. They may also apply Cornell courses conferring proficiency in a non-Western language toward the geographical breadth requirement. They may not apply to either of the breadth requirements (a) advanced placement credit, (b) credit awarded by examination, or (c) if matriculating as freshmen (unless through the Mid-Year Freshman Program), transfer credit.

The Major

In their last two years, students devote roughly one-half their time to acquiring depth and competence in a major subject. The major does not necessarily define a student's intellect or character or lead directly to a lifetime occupation, although it sometimes does some of each. Through the major, students focus and develop their imaginative and intellectual capacities through a subject they find especially interesting.

Most departments and programs specify certain prerequisites for admission to the major; they are found on the following pages in the descriptions of each department and program.

Students may apply for acceptance into the major as soon as they have completed the prerequisites and are confident of their choice. This may be as early as the second semester of freshman year, and may be no later than second semester of sophomore year. To apply, they take a copy of their transcript to an appointment with the director of undergraduate studies in their prospective major. A department or program may refuse admission into the major if the applicant's performance does not meet established standards. A student without a major at the beginning of the junior year is not making satisfactory progress toward the degree. That student must meet with an advising dean, and may not be allowed to continue in the college.

Available majors

Majors are offered by each of the departments. There are also majors in American studies, archaeology, biology and society, religious studies, science of earth systems, and women's studies.

Some students want to pursue a subject that cannot be met within an established major. They may plan, with the help of their faculty adviser, an independent major that includes courses from several departments and even colleges. See "Independent Major Program," under "Special Academic Options." Whatever the major—chemistry, math, philosophy, or music—graduates from the College of Arts and Sciences earn the one degree the college awards, a Bachelor of Arts.

Double Majors

Only one major is required for graduation. Some students choose to complete two

majors. No special permission or procedure is required; students simply become accepted into both majors and find an adviser in each department. Both majors are posted on the official transcript.

Electives

Of the 34 courses and 120 credits required for graduation, almost one-third are free electives. How students use these electives frequently makes the difference between an ordinary and a truly interesting course of study. Students must complete at least four courses and at least 15 credits offered outside the major field and not used to fill another requirement except breadth. AP credits not otherwise used may be used to fulfill elective requirements. Students may group electives to complete one of the established interdisciplinary concentrations described in the pages following the descriptions of departments or may form their own unofficial concentration or "minor" separate from their major. Students may also group electives into a second major. Since only one major is required, students may count courses in a second major as electives. Some students choose to explore a variety of subjects; some develop a concentration in a department or subject outside Arts and Sciences to gain practical training or specialized knowledge.

Residence

The College of Arts and Sciences is a residential college for students who devote their energy and spirit to full-time study. The faculty believes that integrated, full-time study for a defined period best promotes intellectual and creative development and best prepares people for citizenship and careers.

Consequently, eight semesters of full-time study in the College of Arts and Sciences are integral to earning the A.B. degree. Even if the minimum requirements can be met in fewer semesters, the faculty of the college expects students to take advantage of the resources of the university for eight full terms and obtain as rich and advanced an education in the liberal arts and sciences as possible. Students may complete their undergraduate degrees with credits earned at other institutions or as part-time or summer students at Cornell only if they have completed their eight full-time semesters of residence or satisfied the criteria listed below under "Part-time study in final semester."

For transfer students from other institutions each full semester of study at their previous institution counts as one of the eight semesters of residence. However, even if transfer students have completed more than four full semesters at their previous institution, they must spend a minimum of four semesters on the Cornell campus in Ithaca enrolled in the College of Arts and Sciences. Transfers from other colleges at Cornell must spend four semesters on campus in Ithaca as students in the Internal Transfer Division or in the college.

Approved study abroad, SEA Semester, Urban Semester, and Cornell-in-Washington are considered semesters of residence, but not as semesters on the Cornell campus. Students may spend no more than two semesters on such programs and must be on campus during their last semester.

Semesters of extramural study in Cornell's Division of Continuing Education, semesters of study at other institutions while on leave from Cornell, and summer sessions anywhere do not count as semesters of residence.

Acceleration

Some students decide that they do not need eight semesters of residence to obtain a solid undergraduate education. These students must compress the first four semesters and spend four full semesters in the major. Benefitting from opportunities for advanced, seminar, and independent (sometimes honors) work is what best characterizes undergraduate education in the college. Students considering acceleration should discuss their plans with their major adviser.

Accelerants apply to graduate one semester before their intended new graduation date. They obtain an "Application to Graduate" for this purpose in the Office of Undergraduate Admissions and Advising, 55 or 172 Goldwin Smith Hall.

1. Accelerants must meet either condition *a* or *b*:
   a. Complete 60 credits before beginning their last four semesters in the college and complete the prerequisites for admission to the major in time to spend *four* semesters in the major.
   b. Pass 48 credits in College of Arts and Sciences courses numbered "300" and above. Upper-level courses taken in other colleges at Cornell University may count as College of Arts and Sciences credit only if approved for the major.
2. All accelerants are required to complete 100 credits at Cornell at "C" or above. Courses completed with a grade of "S" will count toward the 100 credits. Advanced placement credits do not count toward this requirement.
3. Students may not use credits earned while on leave of absence to reduce their terms of residence.
4. Accelerants may not finish the degree with credits earned in summer or winter session, through part-time study (unless they meet the guidelines for part-time study), or at an off-campus program, including Cornell-in-Washington, SEA Semester, Urban Semester, or study abroad. That is, they may not exit through any program other than a regular, full-time Cornell semester in Ithaca.

Students matriculating as freshmen may not compress their undergraduate education into fewer than six semesters of residence. Transfer students, both from other institutions and from other colleges at Cornell, must satisfy the residence requirement and must spend at least four semesters in the college on campus in Ithaca.

Ninth term

Students who can graduate in eight semesters should do so. If a worthy academic plan for a full ninth or tenth semester is approved, the student enrolls in the college as a special student for the additional work. Such a status allows enrollment in a full schedule of courses for full tuition and full use of campus resources, but allows financial aid only from loans or outside agencies, not from Cornell funds. Students who need only a part-time schedule of courses in a ninth or tenth term in order to graduate should complete the outstanding courses as part-time students paying prorated tuition. Students may spend a ninth term with Cornell aid only with permission of the Committee on Academic Records. Such permission is normally granted only to:

1. Students who have been ill or have an exceptionally compelling academic plan.
2. Students attracted late to a field with a hierarchical curriculum (for example, physics).
3. Students who were academically underprepared for the curriculum at Cornell and needed to begin with a lighter schedule of courses than normal. (See Dean Turner, Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall, about this option.)

Part-time study

Students in good academic standing may take a personal leave of absence and enroll in the Division of Continuing Education, but such semesters of extramural study do not count as terms of residence and credits from such semesters may not be used to reduce the terms of residence.

Part-time study in special circumstances

The college and university support students (with financial aid and services) as best they can to make full-time study possible. Occasionally, however, extraordinary but nonfinancial personal, academic, or medical circumstances make becoming a part-time student necessary and appropriate. Students in good academic standing who face extraordinary situations may petition the Committee on Academic Records for part-time status and proration of tuition in the college.

Students requesting part-time status because of documented disabilities that, under the Americans with Disabilities Act, require appropriate accommodations, should discuss their situation with Dean Walbridge. Otherwise, students should meet with a dean of their class.

Part-time study in final semester

Students may complete their degrees as part-time students paying prorated tuition at Cornell after fewer than eight semesters of full-time residence only if:

1) They have completed all requirements by the end of the sixth or seventh term, met the criteria for accelerated graduation, and are remaining to complete study beyond what is required for the degree.
2) They are writing an honors thesis in the eighth semester and can complete all degree requirements by taking two courses, one of which is the thesis itself. They must register for the thesis and at least one additional course.

In all cases, students must obtain approval of an advising dean in the semester *prior* to the part-time semester and confirm their status and registration with college registrar Sally O'Hanlon in 55 Goldwin Smith Hall.

Courses and Credits

Counting courses and credits

Students must complete at least 34 courses to

graduate—that is, an average of four courses during each of six semesters and five courses during each of two semesters. A three- or four-credit course counts as one course; a two-credit course counts as one-half course. Single-credit courses do not count as part of the 34 except in certain cases when they form a part of a series and two in the same series can be aggregated to count as one-half course (certain offerings in the Departments of Music and of Theatre, Film and Dance fall into this category). Three one-credit courses do not aggregate to count as one course. A six-credit language course counts as 1 1/2 courses, while the summer Falcon Programs in Asian languages count as eight credits and 2 1/2 courses each. Archaeology and geology fieldwork for more than six credits counts as two courses each. BIOGD 281 counts as 1 1/2 courses. Other five- or six-credit courses count as one course. AP exam scores that result in an award of three or four credits count as one course; those in language that result in six credits count as 1 1/2 courses; those in biology that result in six credits count as two courses; those that result in an award of eight credits count as two courses.

Students must also complete 120 credits, 100 of which must be from courses taken in the College of Arts and Sciences. Liberal arts courses approved for study abroad during a semester or academic year of full-time study (not summer study) and courses taken in certain off-campus Cornell residential programs may be counted toward the 100 credits required in the college. Advanced placement credits, credits earned in other colleges at Cornell, or credits earned in any subject at institutions other than Cornell do not count as part of the 100. The only exceptions to the above restrictions are for courses (usually no more than three) that certain departments accept from other colleges at Cornell as fulfilling major requirements and for up to two courses that an adviser accepts as part of a completed and formally established cross-college, inter-disciplinary concentration.

Using courses towards more than one requirement

A course may fulfill more than one college requirement in the following situations:

1) A course may be used to fulfill a distribution requirement and also a major requirement (except as noted under previous section of restrictions on applying AP credits, transfer credits, and Cornell courses to distribution requirements).
2) A one-semester course in foreign literature (not language) that is acceptable for achieving proficiency in that language may also be used as a partial fulfillment of the distribution requirement in the humanities and the arts.
3) Courses may count toward breadth requirements and toward any other requirement except First-Year Writing Seminars.
4) Courses in a second major may count as electives.

Auditing

The college encourages its students to take advantage of its rich curriculum by sitting in on courses that interest them but that they prefer not to take for credit. As long as the instructor agrees, students are welcome to visit courses. Small seminars and language courses are sometimes not open to visitors. Audited courses do not appear on the student's schedule or transcript.

Repeating courses

Students occasionally need to repeat courses. If the instructor certifies that the course content has been changed, credit will be granted a second time. If the content has not changed, both grades nontheless will appear on the transcript and be included in any average that is calculated, but credit will be counted toward the degree only once; students considering repeating a course under this circumstance should discuss the matter with their adviser and an advising dean. Students who plan to repeat a course submit a petition to the college registrar, Sally O'Hanlon, 55 Goldwin Smith Hall. If the original course grade was F, no petition is necessary.

Courses that do not count toward the degree

The college does not grant credit toward the degree for every course offered by the university. Courses in military training, training as emergency medical technician, service as a teaching assistant, physical education, remedial or developmental reading, high school mathematics, supplemental science and mathematics offered by the Learning Strategies Center, English as a second language, keyboarding, and shorthand are among those for which degree credit and credit toward the 12 credits required for good academic standing are not given.

Students enrolled in courses for undergraduate teaching assistants may petition once to have the nondegree credits count towards good academic standing. This would allow continued eligibility for graduating with distinction in all subjects, but would disqualify the student from being on the dean's list that semester.

Advanced placement credit

See p. 6 and 7 Advanced placement credit counts as part of the 120 credits and 34 courses required for the degree. It does not count as part of the 100 credits required in Arts and Sciences; its application to distribution requirements is restricted, as explained under "Distribution."

Summer session credit

A student may earn credit toward the degree by completing courses in Cornell's summer session or by successful petitioning for credit for summer courses at other colleges. Students should consult their advisers regarding summer study plans.

Credit for summer courses not taken at Cornell must be approved by the appropriate Cornell department. Approval forms and information are available on-line, www.arts.cornell.edu, and in the Office of Undergraduate Admissions and Advising, 55 or 172 Goldwin Smith Hall. Transcripts for completed work at other institutions must be sent to Robin Perry, 172 Goldwin Smith Hall. Credit approved for summer courses away from Cornell (including summer or orientation programs abroad) counts toward the 120 credits and 34 courses required for the degree, but does not count toward the 100 credits required in the college. It may be applied to part of the Group I and II distribution requirements, to elective requirements (but not to breadth requirements) and to major requirements (with the approval of the department).

Entering students who want to receive credit toward the degree for courses completed before matriculation in a summer session away from Cornell should obtain approval forms as soon as possible and have transcripts sent to Robin Perry, 172 Goldwin Smith Hall. Credits completed in Cornell summer sessions will be awarded automatically.

Summer session at Cornell or elsewhere does not count toward the eight-semester residence requirement.

Transferring credit earned away from Cornell while on leave of absence

Students may petition to transfer credits from other accredited institutions for work completed while on leave of absence. Petitions are available in 55 and 172 Goldwin Smith Hall and at www.arts.cornell.edu. The relevant department will decide whether the course is comparable to Cornell courses. Credit approved for transfer counts as part of the 120 required for graduation and as part of the 34 courses. It does not count among the 100 credits required in Arts and Sciences and cannot be used to graduate in fewer than eight semesters. Its application to distribution and breadth requirements is restricted as described under "Distribution."

Transferring credit (for transfer students from another institution or from another Cornell college)

Transfer students must satisfy all normal requirements for the degree, including eight semesters of full-time study. They may never complete fewer than 60 credits and 16 courses at Cornell nor be in residence in the college for fewer than four regular semesters (summer session does not count toward the residence requirement). The college evaluates credit and residence earned either at another school or college at Cornell University or at another accredited institution of collegiate rank and determines the number of credits and courses the student may apply toward the various requirements for the Bachelor of Arts degree at Cornell. In addition, it reevaluates advanced placement credit allowed by another institution, including another college at Cornell. Evaluations of transfer credits are normally provided when students are notified of their admission.

SPECIAL ACADEMIC OPTIONS

Degree Programs

The following five programs allow students to alter the regular college or major requirements or to work toward more than one degree.

College Scholar Program

The College Scholar Program frees up to 40 students in each class from the usual college requirements for a degree and allows them to design their own course of study. It is meant to serve students whose interests and talents would benefit from a little more academic freedom than other students have, who demonstrate exceptional promise, and who show the maturity to plan and carry out, with the help of their adviser, a well-designed program of studies. College Scholars design idiosyncratic programs: some pursue diverse

interests; others integrate a variety of courses into a coherent subject.

College Scholars must complete 120 credits of course work (100 in the college), 34 courses, and, unless they receive permission from the program to accelerate, eight full terms of undergraduate study. They must also complete the university's physical education requirement. All College Scholars must complete a senior project. They are not required to complete or fulfill the general education requirements, although members of the College Scholar Advisory Board believe that the spirit of those requirements is a good one.

Each applicant to the College Scholar Program is asked to write an essay, which is due the last Wednesday in April of the freshman year. Mid-year freshmen apply by that date in their first spring semester in the college. Students should contact the director of the program, Office of Undergraduate Admissions and Advising, 55 or 172 Goldwin Smith Hall, for further information.

Dual-Degree Program with Other Colleges

The Dual-Degree Program enables especially ambitious undergraduate students to pursue programs of study in two colleges. Dual-degree candidates may earn both a Bachelor of Arts degree from the College of Arts and Sciences and: (1) a Bachelor of Science degree from the College of Engineering; or (2) a Bachelor of Fine Arts degree from the Department of Art in the College of Architecture, Art, and Planning; or (3) a Bachelor of Science degree in urban and regional studies from the Department of City and Regional Planning in the College of Architecture, Art, and Planning; or (4) a Bachelor of Science degree in architectural history from the Department of Architecture in the College of Architecture, Art, and Planning. Students enter one of these colleges as freshmen or sophomores and begin the Dual-Degree Program with the second college in the second or, in some cases, the third year. The Dual-Degree Program ordinarily takes five years to complete, and students are eligible for ten semesters with financial aid. For further information contact the Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall.

Independent Major Program

The Independent Major Program allows students to design their own interdisciplinary majors and pursue a subject that cannot be found in an established major. Proposals for an independent major must be equivalent in coherence, breadth, and depth to a departmental major, well suited to the student's academic preparation, and consistent with a liberal education. Proposals must also be supported by a faculty adviser and are assessed by a board of faculty members. Independent majors substitute for established majors, but students must still satisfy all the other requirements for the baccalaureate degree. Students should contact the director of the Independent Major Program, Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall, for further information. Deadlines for submitting independent major proposals are listed on the calendar supplement for the College of Arts and Sciences.

Double Registration with and Early Admission to Professional Schools

Registration in the senior year of the College of Arts and Sciences and the first year of Cornell Law School, Cornell Medical College, or the Johnson Graduate School of Management, is occasionally possible. A very few exceptionally well-prepared students who have earned 105 credits before the start of the senior year and have been accepted by one of the above-named professional schools may be permitted to register simultaneously in the college and in one or another of these professional schools during the seventh and eighth terms. They earn the A.B. degree after the first year of professional school.

Students with eight or fewer credits and two or fewer courses to complete may apply to enter the Master's of Engineering program during (but no earlier than) the last semester; dual-degree students may enter this program no earlier than the ninth semester. They earn the bachelor degree(s) after one semester of graduate school.

Students interested in the joint program with the Law School or the Graduate School of Management, or in early admission to the Master's of Engineering program should apply to the relevant program. Students interested in the joint program with Cornell Medical College should contact the health careers coordinator, 203 Barnes Hall. All candidates should confirm their eligibilty with an advising dean, Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall.

Double-registered students must, of course, complete all requirements for the A.B. degree, including 100 credits in Arts and Sciences courses.

Teacher Education in Agriculture, Mathematics, and Science

Students at Cornell may pursue teaching credentials in agriculture, biology, chemistry, earth science, general science, mathematics, and physics. Teacher Education in Agriculture, Mathematics and Science (TEAMS) is a university program jointly conducted by the departments of Education and Mathematics. Cornell Students from any college are encouraged to apply for admissions to TEAMS during their sophomore year. Those who are admitted complete their undergraduate major in an agricultural science, mathematics or one of the sciences, while taking Education courses. They are then able to complete a Master of Arts in Teaching (MAT) degree in one year.

For more information, contact the TEAMS Program Coordinator at 255–9573.

Special-Interest Options

The following options enable students to pursue special interests within the usual degree programs.

Concentrations

Established interdisciplinary concentrations, described in the pages following the descriptions of the departments and their curricula, provide structures for organizing electives. Completed concentrations are noted on the transcript.

Informal Minors

Some students organize electives within a discipline or department. Such informal minors can be developed with the help of the departmental directors of undergraduate studies. They are not noted on the transcript.

Independent Study

Independent study affords students the opportunity to pursue special interests or research not treated in regularly scheduled courses. A faculty member, who becomes the student's instructor for the independent course, must approve the program of study and agree to provide continuing supervision of the work. Students must prepare a proposal for independent study (proposal forms are available on-line at www.arts.cornell.edu and in the Office of Undergraduate Admissions and Advising, 55 and 172 Goldwin Smith Hall). In one semester students may earn up to six credits with one instructor or up to eight credits with more than one instructor.

Undergraduate Research Program

An excellent way to benefit from being an undergraduate at a research university, at Cornell in particular, is to become an apprentice in on-going faculty research. About 400 students participate each year in creating new knowledge and earn independent study credit for what they learn and contribute. They sharpen their critical and creative abilities and test their interest in pursuing a research career. Sometimes they publish their work.

The Undergraduate Research Program gathers information about research opportunities in most disciplines of the liberal arts and sciences, guides students in finding further opportunities—on campus and elsewhere and during the academic year and the summer—and helps students prepare for research and presenting themselves as candidates for apprenticeships. Other students locate research opportunities independently through faculty whose courses they have taken, through their major departments, or through published materials.

The Cornell Undergraduate Research Board, an undergraduate organization, conducts an annual open house to help students get started in research and an annual forum at which undergraduates present their work.

Students interested in this program should consult the Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall.

Language Study

FALCON (Full-Year Asian Language Concentration). FALCON allows students who are interested in the Far East to study Chinese or Japanese exclusively for one year. They gain proficiency in the language and familiarity with the culture. Students who are interested in the Far East should be aware of the opportunities to pursue rapid and thorough beginning studies on campus with the objective of studying abroad later—in China or Japan. Students interested in this program should contact the Department of Asian Studies, 388 Rockefeller Hall; e-mail: falcon@cornell.edu.

Language House Program

A complement to classroom cultural and linguistic instruction, the Language House Program combines residential and academic opportunities for developing and practicing conversational skills in French, German,

Italian, Japanese, Mandarin Chinese, and Spanish. It helps prepare students who plan to study abroad and helps returning students share their cultural experiences while further increasing their language skills. Students interested in this program should see Academic Administrator Daniel Evett, 136 Goldwin Smith Hall.

Prelaw Study

Law schools neither require nor prefer any particular program of study; they do seek students with sound training in the liberal arts and sciences. Students should therefore plan a program in which they are interested and do well. Beyond that, students are advised to take courses that will develop their powers of precise, analytical thinking and proficiency in writing and speaking.

The college offers a concentration in law and society. Students should work toward completion of this concentration because they find it interesting, not because they hope to impress law schools.

Students in the College of Arts and Sciences who are applying to law school may consult a career adviser in the Office of Undergraduate Admissions and Advising, 61 Goldwin Smith Hall.

Premedical Study

The breadth and depth afforded by a liberal arts education are invaluable for students planning medical careers, whether they intend to practice or go into research. Such training has a profound effect on the doctor's usefulness to patients, and it affords the flexibility of mind that is needed for major research undertakings. Medical and dental schools do not prescribe or even prefer a particular major; they do, however, require particular undergraduate courses, and most students are well advised to begin chemistry in their freshman year. Students who are interested in medical careers are urged to visit the Health Careers Office, 203 Barnes Hall.

The adviser for students in the College of Arts and Sciences who are planning careers in medicine is Dean Turner, Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall.

Off-Campus Programs

Many students find it important to their majors or to their overall academic programs to study off campus or abroad for one or two semesters. When it makes academic sense, the college encourages its students to pursue such studies and grants credit toward the degree for work satisfactorily completed.

Study Abroad

Each year about 200 undergraduates in Arts and Sciences include semester- or year-long study abroad as part of their formal undergraduate education. Ideally, study abroad builds on a broad liberal arts background in the early semesters: area studies, language training, and preparation in the proposed field of study are all essential.

Many students go abroad to pursue work in their majors. Focused academic work in an appropriate institution abroad can prepare students for advanced study or honors work in the final semesters back in Ithaca.

The college insists wherever possible on study at foreign institutions alongside their degree candidates rather than study in self-contained programs that offer courses specially designed for foreigners. The primary goals of this educational immersion are to learn firsthand the modes of inquiry, methods of analysis, and educational values of higher education offered to students of another country and to involve students in social relationships with peers who may hold a new and unexpected range of social attitudes.

The college advocates study abroad that enables students to become competent enough in another language to experience daily life, develop social relationships, and accomplish formal course work in that language. **Students who intend to study abroad in a country where the host language is not English must demonstrate a serious commitment to learning the language through course work before studying abroad; specific language requirements may vary, but most programs require two semesters of 200-level language instruction.** At least one area studies course or one course in the history, culture, economics, politics, or social relations of the country of destination must be part of every student's preparation for study abroad.

Students planning to study abroad need solid academic credentials to do so productively and successfully. The college requires a minimum overall grade point average of 3.0 for all Cornell course work and good academic standing in the semester immediately before going abroad.

Study abroad is possible during the sophomore and junior years or during the first semester of the senior year. Study abroad in the final semester is rarely approved. Important steps to prepare for study abroad include

- substantial progress with college distribution requirements;
- admission to a major and a faculty adviser in the major;
- clear academic agenda for study abroad;
- appropriate preparatory study of the country or region of destination, especially language study.

Study abroad can earn up to 15 liberal arts and sciences credits per semester of full-time course work as long as the curriculum abroad is consistent with that of the college. A maximum of 10 credits is awarded for each trimester of study. Courses that fall outside the scope of the liberal arts and sciences may earn non-Arts credits. Students must carry a full course-load as defined by the host institution. Students may spend up to two semesters abroad. Only those with compelling academic reasons may study in more than one location over two semesters. The college does not approve study abroad that tours more than one country or that is more touristic than scholarly in content and structure. Students must continue study of the host language while abroad. Only in exceptional circumstances will the college approve programs which, in non-English speaking countries, provide no language training.

Applications to study abroad must have the support of a faculty adviser in the major and the approval of an advising dean in the Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall. Although students investigate options for study abroad and submit final applications through the Cornell Abroad office, Arts and Sciences applicants submit to the college an essay describing the academic rationale for study abroad, an outline of prospective courses to be taken and any other relevant materials.

All courses taken abroad will appear on the Cornell transcript and grades earned are reported in the system of the host institution. Grades earned through course work abroad do not, however, become part of the Cornell grade point average.

Students who transfer to Cornell and must complete at least four semesters of residence on campus in Ithaca may not study abroad as one of those four semesters.

All applicants for study abroad during the academic year, must go through the Cornell Abroad Office after being approved by the College of Arts and Sciences. For more information see Dean Wasyliw, 55 Goldwin Smith Hall.

Summer Residential Programs in Archaeology

During the summer months students may participate in a Cornell-sponsored archaeological project. In recent years the program has organized archaeological projects in Central America, Greece, Israel, Italy, and New York State. Students should contact the Archaeology Program for information about the sites currently available.

Marine Science

Shoals Marine Laboratory is a seasonal field station that offers a variety of courses and experiences designed to introduce undergraduates to the marine sciences. The laboratory is located on Appledore Island, six miles off the Maine/New Hampshire coasts. Students should contact the Shoals Marine Laboratory Office, G14 Stimson Hall, for further information.

Cornell-in-Washington

The Cornell-in-Washington program offers students from all colleges in the university an opportunity to earn full academic credit for a semester in Washington, D.C. Students take courses from Cornell faculty, conduct individual research projects, and work as externs. The Cornell-in-Washington program offers two study options: (1) studies in public policy, and (2) studies in the American experience. The program also offers unique externship opportunities: students serve as externs in a federal agency, congressional office, or non-governmental organization and take part in a public policy or humanities seminar. They define and carry out individual research projects under the supervision of Cornell faculty. Potential externships are arranged through, and approved by, the Cornell-in-Washington program. For further information, see p. 20 or inquire at 311 Caldwell Hall, 255–4090. Study in Washington during a final semester of residence is allowed only and unusually by petition. Students should consult with the dean of seniors, Office of Undergraduate Admissions and Advising, 172 Goldwin Smith Hall.

Fieldwork

Sometimes it is appropriate for students to include fieldwork as part of their major. A three-member faculty committee helps the student plan the project, arranges for ongoing

supervision, and evaluates the project at the end of the term. Fieldwork almost always involves writing a long paper or several short ones, as well as practical experience. All proposals for fieldwork must be presented in advance to the college faculty's Committee on Academic Records for approval. A maximum of 15 credits in fieldwork may be earned. For further information students should contact an advising dean in Office of Undergraduate Admissions and Advising, 55 or 172 Goldwin Smith Hall.

ACADEMIC INTEGRITY

Academic integrity is the heart of intellectual life in the college—both in learning and in research. All members of the university community simply must support each other's efforts to master new material and discover new knowledge by sharing ideas and resources, by respecting each other's contributions, and by being honest about one's own work. Otherwise the university will fail to accomplish its most central and important goals.

Cornell's Code of Academic Integrity and policy about acknowledging the work of others are among the documents new students receive. Students should read them carefully and not assume they understand what integrity and cheating are and are not. Academic integrity implies more here at the university than it usually did in high school. The standards of integrity are those that prevail in professional life. This means that students must acknowledge and cite ideas they adopt from others (not just direct quotations) and help they receive from colleagues. With productive emphases on collaborative learning and writing, students must understand the general standards and policies about academic integrity and be sure they understand the expectations in individual courses as well. When in doubt, ask the instructor.

ADVISING

The following advisers and offices provide academic advising, help with problems, and information on college procedures and regulations.

Faculty Advisers

Each new student is assigned a faculty adviser. Advisers help students plan programs of study and advise them about ways to achieve their academic goals. Advisers may also help students with study or personal problems or may direct them to other offices on campus where help is available. Academic difficulties may frequently be solved or avoided if students and advisers recognize and address problems early.

Advisers and new advisees meet first during orientation week to discuss course selection. New students are encouraged to see their advisers again early in the term, before it is too late to drop courses, to discuss their academic progress and to become better acquainted. Advisers and advisees meet at least once each semester to discuss courses for the following term and more often if advisees wish to discuss academic or personal issues or to petition for an exception to college rules.

Student Advisers

Student advisers pass on lore about the college and life at Cornell and help new students negotiate the university.

Major Advisers

After acceptance into a major, students are assigned a major adviser, a faculty member in the major department, with whom they shape and direct their course of study. The adviser eventually certifies the completion of the major. The major adviser should be consulted by the student about all academic plans, including honors, study abroad, acceleration, and graduate study. The adviser's support is especially important if a student petitions for an exception to the requirements for the degree.

Office of Undergraduate Admissions and Advising

This office, 55 Goldwin Smith Hall, 255–5004 and 172 Goldwin Smith Hall, 255–4833, is a resource for faculty and student advisers and especially for students themselves and their parents. Advising deans are available to help students define their academic and career goals, to help with special academic options and exceptions to college rules, and to help when problems arise:

Lynne S. Abel, associate dean for undergraduate admissions and advising—255–3386

David Devries, juniors and seniors and undergraduate research—255–4833

Daniel Evett—Language House Program—255–6543

Stephen Friedfeld, mid-year freshman and first- and second-year students—255–4833

Ken Gabard, first- and second-year students and College Scholar Program—255–5004

Lisa M. Harris, career services and pre-law advising—255–6926

Irene Komor, career counselling—254–5295

Lawrence Lamphere, internal transfers and minority students—255–4833

Diane J. Miller, career services—255–6924

Sally O'Hanlon, registrar—255–5051

Janice Turner, minority students and pre-med advising—255–9497

Peggy Walbridge, transfer students and students with disabilities—255–4833

Catherine Wagner, juniors and seniors and dual degree students—255–4833

Patricia Wasyliw, first- and second-year students and study abroad—255–5004

REGISTRATION AND COURSE SCHEDULING

Enrollment in Courses in the College of Arts and Sciences

New Students

During orientation week, new students attend briefings and other information sessions, meet with faculty advisers, and sign into courses. The college reserves spaces in courses for its in-coming students.

Continuing Students

Continuing students select and schedule up to five courses of 3 or more credits and as many 1 and 2 credits as they would like during the semester prior to the one in which the courses will be taken. Students who do not "pre-enroll" during the designated period must wait until the beginning of the term and may have difficulty securing places in the courses they most want. Before signing into courses, students plan their programs and discuss long-range goals with their faculty advisers. In addition, all students are welcome to discuss programs and plans with an advising dean in the Office of Undergraduate Admissions and Advising, 55 or 172 Goldwin Smith Hall.

At the beginning of each term, students find their schedules and should confirm the accuracy of their records on "Just the Facts."

Limits on Numbers of Courses and Credits

To meet the 34-course requirement, students must normally take four courses during each of six semesters and five courses during each of two semesters. To meet the 120-credit requirement, students must average 15 credits per semester. (AP credit and/or summer credits may reduce the average numbers of courses and credits required each semester.)

Minimum number of credits per semester

To maintain good academic standing as a full-time student, students must complete at least twelve degree credits per semester; if for compelling personal or academic reasons students need to carry fewer than 12 credits, they should consult their faculty adviser and an advising dean. Permission is by petition only; it is freely given for first-semester students.

Maximum number of credits per semester

First-term freshmen must petition to register for more than 18 credits; other students may register for more than 18 credits if their previous term's average was 3.0 or higher and they are in good academic standing. No more than 22 credits may be taken in a regular semester without permission of the college's faculty Committee on Academic Records. Students who fail to receive approval for excess credits from the committee normally may count only 18 credits for the semester toward the degree.

Attendance

Attendance in classes is expected. Absences are a matter between students and their instructors. If a student cannot attend classes because of illness or family crisis, the Office of Undergraduate Admissions and Advising will notify instructors at the request of the student or the family. Nonetheless, the student must arrange to make up examina-

tions or other work with each instructor. A student who will be absent because of religious holidays or athletic competitions must discuss arrangements for making up work with his or her instructors well in advance of the absence. A student who must miss an examination must also consult with the professor in advance. Alternative arrangements are at the discretion of the instructor.

Adding and Dropping Courses

After course enrollment (also known as pre-enrollment), students may not adjust their schedules until the new term begins. During the first three weeks of the semester, students may change courses without petitioning. Add/drop forms are available in the Office of Undergraduate Admissions and Advising, 55 or 172 Goldwin Smith Hall. (Note: the add period for First-Year Writing Seminars is only two weeks.)

After the third week of classes, students must petition to add courses and may normally add them only for a letter grade. They may drop courses up to the seventh week of the term, if the department approves and no issue of academic integrity is at stake. Between the seventh and twelfth weeks students may petition to withdraw from courses, if (1) the instructor approves; (2) the adviser approves; (3) an advising dean approves; and (4) no issue of academic integrity is at stake. Students must meet with an advising dean to obtain petition forms.

Courses dropped after the seventh week will be noted on the transcript by a "W" where the grade would normally appear. **This is a matter of record and cannot be petitioned. Petitions to withdraw from courses may not be submitted after the end of the twelfth week in the term.** Deadlines for short courses will be adjusted according to the length of the courses.

The effective date of all course changes will be the day the student submits all completed paperwork to the Academic Advising Office.

Leaves of Absence

Taking time off from college to explore goals, find direction, or to gain experiences or funds is sometimes useful. Usually, of course, students take leaves at the end of a semester for the following semester. Students in good academic standing, however, may take a leave as late as the seventh week of a semester, although there are serious financial consequences to taking leaves after a term has begun. Five years is the maximum length of time a student may be on leave and return without special permission. Leaves of absence are of four types:

1) *Personal leaves* impose no conditions concerning reentering the college except for the five-year limit. Readmission is automatic upon written request made at least one month before the beginning of the term in which the student wishes to return.
2) *Medical leaves*, usually for at least six months, are granted by the college only on recommendation by University Health Services. In some cases, students must satisfy the UHS that the condition requiring the leave has been corrected before they may return. The student's academic standing will also be subject to review at the time of the leave and on return.
3) *Conditional leaves* are granted when the student is not in good academic standing or, in unusual circumstances, between the seventh and twelfth weeks of the term. In consultation with the student, an advising dean sets the conditions for the student's return. Normally students may not return from conditional leaves for at least two terms or until specific and individual conditions, such as completing unfinished work, have been met. Students may be granted conditional leaves after the twelfth week of a term only under extraordinary circumstances and with the approval of the faculty's Committee on Academic Records.
4) *Required leaves:* The Committee on Academic Records may require a leave of absence if a student is not making satisfactory progress toward the degree. See the section "Academic Actions."

Any student who wishes to take a leave of absence should consult an advising dean in the Office of Undergraduate Admissions and Advising, 55 or 172 Goldwin Smith Hall. On readmission, the student's graduation date will be recalculated.

Transferring Credits Earned While on Leave

Students who take courses elsewhere in the United States while on leave may petition to have credits transferred. Approval depends on acceptable grades and the judgment of the relevant departments about the quality of the courses. If approved, these credits may be applied toward the 120 credits and 34 courses needed for graduation, but not toward the 100 credits required in the college. They may be applied to part of Group I and II distribution requirements (not to Group III or IV), to elective requirements (but not to breadth requirements) or to the major as allowed by the department. Credits earned during a leave do not count toward the eight semesters of residence and may not be used to reduce the terms of residence. See the section "Residence."

Study Abroad and International Students on Leave of Absence

Study abroad undertaken during a leave of absence will not receive academic credit. International students on leave of absence from the College of Arts and Sciences may enroll in courses at a college or university in their home country **only**, as such enrollment is not defined as study abroad. They may petition for transfer of credit upon return to Cornell. If approved, the credit will count as described in the previous paragraph.

Withdrawals

A withdrawal is a permanent severance from the university and from status as a degree candidate. Students planning to withdraw should consult an advising dean. Students not requesting a leave and failing to register for a term will be withdrawn from the college. The college faculty's Committee on Academic Records may require a student to withdraw for a highly unsatisfactory academic record.

Transferring within Cornell (Internal Transfer)

Internal transfer from one college or school at Cornell into another is attractive for many students whose intellectual interests change (or become more focused). Students who want to transfer should discuss their eligibility with a counselor in the new school or college.

In some cases, students who want to transfer into the College of Arts and Sciences may transfer directly. In other cases, they may be referred to the Internal Transfer Division. During the term immediately preceding transfer into the College of Arts and Sciences, students should complete at least 12 credits of courses in the College of Arts and Sciences with a 3.0 average and without any grades of *Incomplete*, any S-U grades (unless only S-U grades are offered for that particular course), or any grades below C. Satisfying this minimum requirement does not, however, guarantee admission. Admission to the college is based on consideration of the student's entire record at Cornell and the high school record, not just the work of one semester. It is also based on ability to complete the A.B. degree within a reasonable time. Internal transfers are required to spend four semesters in Arts and Sciences and thus should initiate the transfer process no later than the second semester of sophomore year. Interested students should see Dean Lamphere, 172 Goldwin Smith Hall.

ACADEMIC STANDING

Students are in good academic standing for the term if they successfully complete at least 12 degree credits by the end of the term and earn no more than one D and no F or U grades. If a student completes only three courses, all grades must be above D. In addition, students are expected to make satisfactory progress toward satisfying requirements for the degree and to earn grades of C (not C–) or better in at least 100 of the 120 credits for the degree. Courses listed under "courses that do not count toward the degree" do not count toward good academic standing in a semester.

Academic Actions

Students who are not in good academic standing will be considered for academic action by the college's faculty Committee on Academic Records or by one of the advising deans of the college. They are urged to present evidence that will help explain their poor academic performance. Students may appeal a decision or action of the committee, if they have new relevant information. They must consult an advising dean about appealing.

Warning

Any student who fails to maintain good academic standing will, at a minimum, be warned. A warning is posted on a student's college record but is not reported to the university registrar and does not appear on official transcripts.

Required leave of absence

A student in serious academic difficulty may be required by the faculty Committee on Academic Records to take a leave of absence, normally for a full year. Usually, but not always or necessarily, the Committee on Academic Records warns students before suspending them. Before being allowed to return and reregister in the college, students must document what they did on leave and how they resolved their problems and submit a plan for completing the degree. In some

cases students will be required to furnish evidence that they are ready to return or satisfy other conditions before being allowed to reregister in the college. Students who request to return in less than a year must present to the committee extraordinarily convincing evidence of their readiness to return. "Required leave" and the date are posted on the student's official transcript.

Required withdrawal

The faculty Committee on Academic Records may dismiss a student from the college because of a highly unsatisfactory record for one term or for failure to make satisfactory overall progress in grades, credits, or degree requirements. This action expels the student permanently from the college. "Required withdrawal" and the date are posted on the student's official transcript.

Forgery on Forms

Forging signatures or credentials on college forms is an academic offense; sometimes it constitutes academic fraud. In all cases of forgery on academic forms, the effect of the forged documents shall be negated. Students may then petition properly to do whatever they attempted to do improperly. Such incidents will be recorded in the Academic Integrity Hearing Board's confidential file for forgeries. If a student forges more than once or if the forgery would advance the student's academic standing unfairly or fraudulently, or if for any other reason the situation requires some response in addition to the uniform penalty, the Academic Integrity Hearing Board might make a different recommendation, such as a notation on the student's transcript, suspension, or dismissal.

GRADES

Letter Grades

See Grading Guidelines, page 13.

S-U Grades

The S-U (satisfactory-unsatisfactory) option allows students to explore unfamiliar subjects or take advanced courses in subjects relatively new to them without being under pressure to compete with better prepared students for high grades. It is not meant to allow students to reduce the amount of work they complete in a course or the amount of effort they devote to it. The S-U option is contingent upon the instructor's willingness to assign such grades. Students must select their grading option and obtain the instructor's approval for the S-U option during the first three weeks of the term. Virtually no exceptions to this deadline are permitted, and consequently students adding courses after the third week of the term must normally add them for a letter grade. A grade of S is equivalent to a grade of C– or higher; a grade of U, which is equivalent to any grade below C–, is a *failing* grade equal to an F. S means the student receives the credit specified for the course. U means no credit is given. A few courses in the college are graded exclusively S-U; in that case, the final grade appears on the transcript as SX or UX.

Courses that will count toward satisfaction of major requirements should not be taken for an S-U grade unless the department grants permission. Students may elect the S-U option in courses used to satisfy the distribution, and elective requirements, provided that such courses do not also count toward major requirements or serve as prerequisites for admission to the major. Students are advised to use the S-U option sparingly if they intend to apply to graduate school or for transfer to another college. There is no limit on the number of courses each term for which students may elect the S-U grade, but within the 120 credits required for the degree, a minimum of 80 credits must be in courses for which a letter grade was received.

Grades of Incomplete

A grade of incomplete signifies that a course was not completed before the end of the term for reasons beyond the student's control and acceptable to the instructor. Students must have substantial (normally at least 50 percent) equity in the course; that is, they must be able to complete the remaining work without further registration and must have a passing grade for the completed portion. When a grade of incomplete is reported, the instructor submits a form stating what work must be completed, when it must be completed, and the grade (or "frozen" incomplete) earned if the work is not completed by that date. When a final grade is determined, it is recorded on the official transcript with an asterisk and a footnote explaining that this grade was formerly an incomplete.

Students must resolve (make up or "freeze") any incompletes with their instructors before graduation.

Note of R

R designates two-semester or year-long courses and students enroll in the course both semesters, each time for the full number of credits for the whole course. The R is recorded on the student's transcript at the end of the first term. The grade recorded at the end of the second term evaluates the student's level of performance in the course for the entire year. The total of credits earned for the whole course is listed each term.

Grade Reports

Students should periodically check their courses and grades on "Just the Facts" to be sure that they are recorded correctly.

Class Rank

The college does not compute class rank.

Dean's List

Inclusion on the Dean's List for academic excellence is an honor bestowed by the dean of the college semester by semester. Based on grades, the criteria include about the top 30 percent of students and vary with the number of credits the student completes. The criteria are subject to slight changes from semester to semester and are available in the Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall.

GRADUATION

The Degree

The College of Arts and Sciences grants only one degree (no matter what the student's major): the A.B. (or B.A.). A.B. is the abbreviation of the Latin name for the degree, "Artium Baccalarius," or translated into English, B.A., "Bachelor of Arts."

Application to Graduate

In the first semester of their senior year, students attend senior briefings and then complete an application to graduate. The application allows the college to check each student's plan for fulfilling college requirements. This process is intended to help seniors identify problems early enough in the final year to make any necessary changes in course selection to satisfy those requirements. *Nonetheless, meeting graduation requirements is the student's responsibility;* problems that are discovered, even late in the final term, must be resolved by the student before the degree can be granted.

Degree Dates

There are three degree dates in the year: May, August, and January. Students who plan to graduate in August may attend graduation ceremonies in the preceding May. Students graduating in January are invited to a special recognition ceremony in December; they may also attend graduation ceremonies the following May.

Honors

Bachelor of Arts with Honors

Almost all departments offer honors programs for students who have demonstrated exceptional ability in the major and who have completed original independent research. The honors programs are described by individual departments in their following sections. The degree of Bachelor of Arts with honors will be conferred upon students who, in addition to having completed the requirements for the degree of Bachelor of Arts, have satisfactorily completed the honors program in their major and have been recommended for honors by their major department, the Independent Major Program, or the College Scholar Program. Concentrations do not offer honors programs.

Bachelor of Arts with Distinction

The degree of Bachelor of Arts with distinction in all subjects will be conferred on students who have completed the requirements for the degree of Bachelor of Arts, if they have met the following requirements by the end of their final semester:

1) completed at least 60 credits while registered in regular sessions at Cornell;
2) ranked in the upper 30 percent of their class at the end of the seventh semester, or next-to-last semester for transfers and accelerants;
3) received a grade below C– in no more than one course;
4) received no failing grade;
5) have no frozen *Incompletes* on their records, and
6) maintained good academic standing, including completing a full schedule of at least 12 credits, in each of their last four terms.

CALENDAR SUPPLEMENT

All of the dates in the university calendar at the front of this volume apply to all Cornell students. Listed below are some additional dates that are of importance for students in the College of Arts and Sciences.

	Fall 2001	*Spring 2002*
Last day for adding courses without petition.	Sept. 21	Feb. 8
Last day for adding a First-Year Writing Seminar.	Sept. 14	Feb. 1
Last day for changing grade option to S-U or letter.	Sept. 21	Feb. 8
First deadline for submitting independent major requests. Go to Academic Advising Center, 55 Goldwin Smith Hall, for further information.	Sept. 27	Feb. 21
Last day for dropping courses without petition.	Oct. 19	March 8
Last day to petition to withdraw from a course.	Nov. 26	April 19
Second deadline for submitting independent major requests. Go to the Office of Undergraduate Admissions and Advising, 55 Goldwin Smith Hall, for further information.	Nov. 29	April 4
Deadline for requesting internal transfer to the College of Arts and Sciences for the following term.	Dec. 1	May 1
Deadline for applying to the College Scholar Program.		April 24
Deadline for applying to study abroad.	See Cornell Abroad, 474 Uris Hall	
Course enrollment (preregistration) for the following term.	TBA	TBA

ADMINISTRATION

Philip E. Lewis, dean—255–4146

Jon C. Clardy, senior associate dean—255–4147

Jonathan D. Culler, senior associate dean—255–4147

Lynne S. Abel, associate dean of admissions and undergraduate education—255–3386

Jonathan B. Monroe, associate dean and director of writing programs—255–4061

Jane V. Pedersen, associate dean of administration—255–7507

Courses and Departments

SPECIAL PROGRAMS AND AREAS OF CONCENTRATION

The college offers a number of interdisciplinary programs described in the section following the departmental program descriptions.

AFRIKAANS

See Department of German Studies (Dutch).

AFRICANA STUDIES MAJOR

See Special Programs and Interdisciplinary Studies.

AKKADIAN

See Department of Near Eastern Studies.

AMERICAN STUDIES

See Special Programs and Interdisciplinary Studies.

ANTHROPOLOGY

D. Holmberg, chair; R. Ascher, T. Bestor, D. Boyer, A. Clark Arcadi, J. Fajans, D. Greenwood, J. Henderson, B. J. Isbell, B. Lambert, K. March, V. Munasinghe, N. Russell, P. S. Sangren, V. Santiago-Irizarry, J. Siegel, M. Small, T. Turner, T. Volman, A. Willford. Emeritus: J. Murra, R. Smith.

Anthropology is one of the most diverse disciplines in the university. Spanning human evolution, the development and heterogeneity of language and culture, human history, and the diversity of cultures past and present, the field has broad scope, uses a variety of methods, addresses basic issues about human origins and human life, and maintains commitment to understanding social life and using this understanding to improve society. Anthropology is an ideal "liberal arts" major. It also serves as a major that, when well designed by the student with their adviser, prepares students for a wide range of professional careers, e.g., law, medicine, foreign service, social services, and business, among others.

Courses for nonmajors: Anthropology welcomes nonmajors into many of its courses. Unless prerequisites are explicitly stated, 200- and 300-level courses do not have formal prerequisites and can be taken by students without prior experience in anthropology. Such students are welcome in these upper-level courses. For additional information to assist nonmajors and students from other colleges in selecting anthropology courses, see the anthropology department web page (falcon.arts.cornell.edu/~anthro/).

The Major

The range and complexity of the field of Anthropology requires active collaboration between the student and a faculty adviser in developing an individualized program of study. To enter the anthropology major, a student must pass one course in each of the two broad introductory areas of anthropology: "Nature and Culture" and "Culture and History" listed below under the heading "Introductory Courses." Provisional acceptance into the major is possible before completing these courses, with permission from the Director of Undergraduate Studies in anthropology. Students are encouraged to contact the Director of Undergraduate Studies or other faculty members as soon as possible in their studies to discuss their interests and a possible major in anthropology.

Students see the Director of Undergraduate Studies to apply to the major and get an adviser. They prepare a short statement about their interests and goals for the major, then meet with their adviser to develop a course plan reflecting these special interests. This concentration should include at least 32 credits in addition to the two introductory courses used to enter the major. Examples of possible concentrations are myth and ritual; ethnicity and identity; action research; nature and culture in human history; anthropology and literature, or law, or the arts, or medicine; human origins; ethnomusicology; primate and human behavior; prehistory of the Americas, or Europe, or Africa; cultural construction of the person; etc. When warranted, the adviser is free to approve up to two cognate courses from other departments totaling up to eight credit hours to fulfill the 32-credit requirement. Students may revise their program of study in consultation with their adviser as they move through their studies. Our goal is to provide a close and supportive advising relationship and a strong and coherent structure for the student's major.

In the senior year, all Anthropology majors are required to take one of the Anthropology Senior Seminars offered by the department (archaeologically oriented majors may substitute Approaches to Archaeology or Archaeological Research Design). These seminars are designed to provide broad integrating perspectives on the contemporary field of anthropology through the study of principal trends, contemporary issues, history, etc.

Study abroad and off-campus study programs: the Department of Anthropology encourages students to consider a semester of study abroad or off-campus study developed as an integral part of the student's major concentration. The Director of Undergraduate Studies serves as the Anthropology Study Abroad adviser.

The Cornell-Nepal Study Program: the Cornell-Nepal Study Program is a joint program of Cornell University and Tribhuvan University, the national university of Nepal. Qualified juniors, seniors, and first- or second-year graduate students work with faculty from both universities to prepare for and undertake field research projects in Nepal. Students receive 15 credits per semester; students may enroll for either fall or spring semester, or for the entire year; application is through Cornell Abroad. For further information, consult David Holmberg or Kathryn March in the Department of Anthropology.

Other anthropologically-relevant study abroad options, using existing Cornell Abroad and off-campus options, can be worked out in consultation with the major adviser, the Anthropology Study Abroad adviser, and Cornell Abroad.

Honors

Honors in anthropology are awarded for excellence in the major, which includes overall grade point average and completion of an honors thesis. Anthropology majors interested in the Honors Program should consult the chair of the Honors Committee in their junior year. To qualify for entrance into the Honors Program, a student must have at least a 3.0 GPA overall and 3.3 GPA in the major, and the consent of a faculty member in anthropology who will guide the honors thesis. After applying to the program and being admitted as a candidate by the Honors Committee, the student conducts research and writes a thesis. This thesis is evaluated by the faculty research adviser and two other faculty members. Honors (i.e., cum laude, magna cum laude, or summa cum laude) are awarded based on the quality of the thesis and the student's overall record. Honors candidates must start this process by consulting their major adviser about the honors program early in their junior year.

While working on the thesis during the senior year, students should make use of the Senior Seminar as a place to develop the ideas for their thesis. In addition, students may enroll in ANTHR 483 (fall or spring) "Honors Thesis Research." To complete the thesis, students must enroll in 491 (fall or spring) "Honors Thesis Write-up." Only ANTHR 483 may count toward hours for completion of the anthropology major requirements. The credit hours for these courses are variable, grades for these courses are given by the faculty research adviser, and they are based on performance during thesis research and writing.

Any honors candidate whose research directly involves working with human subjects must receive approval for the project from the Cornell University Committee on Human Subjects.

Special Programs and Facilities

Collections: the department has an extensive collection of archaeological and ethnological materials housed in the anthropology collections. A limited number of students can make arrangements to serve as interns in the anthropology collections. Olin Library houses some of the most extensive collections of materials on the ethnology of Southeast Asia, South Asia, East Asia, and Latin America to be found anywhere in the United States. The biological anthropology laboratory (McGraw B65) houses an extensive collection of materials for teaching purposes, including (1) human skeletal remains, (2) articulated skeletons and cranial casts of primates, and (3) casts of important fossils in the human lineage.

Independent Study: specialized individual study programs are offered in Anthropology 497, Topics in Anthropology, a course open to a limited number of juniors and seniors who have obtained consent and supervision of a faculty member. Undergraduates should note that many 600-level courses are open to them by consent of the instructor.

Colloquia: the Department of Anthropology holds colloquia almost every week of the semester on Friday at 3:30 in McGraw 215. Faculty members from Cornell and other universities participate in discussions of current research and problems in anthropology. Students are encouraged to attend.

For more complete information about the anthropology major, see the Director of Undergraduate Studies, pick up a copy of the major brochure (which includes descriptions of the courses not offered during 2001–2002), or visit the Anthropology Department web page (falcon.arts.cornell.edu/~anthro/).

I. Introductory Courses

A. Nature and Culture:

ANTHR 101 Introduction to Anthropology: Biological Perspectives on the Evolution of Humankind (I Supplementary List)
Fall. 3 credits. M. Small.
The evolution of humankind is explored through the fossil record, studies of the biological differences among current human populations, and a comparison with our closest relatives, the primates. This course investigates the roots of human biology and behavior with an evolutionary framework. Fee for lab usage and maintenance, $5.

ANTHR 103 The Scope of Anthropology
Spring. 1 credit. Prerequisite: concurrent enrollment in or prior completion of ANTHR 101 or ANTHR 102. S-U grades only. Staff.
This course is intended for majors or prospective majors in anthropology. Each week a different member of the faculty in anthropology at Cornell makes a presentation on the nature of their work within the field and discusses their interests with students. The course is meant to introduce the range of approaches found within anthropology and help students in planning future course work.

[ANTHR 203 Early People: The Archaeological and Fossil Record (also ARKEO 203) # (III)
Spring. 3 credits. Not offered 2001–2002.]

[ANTHR 211 Nature and Culture @ (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 275 Human Biology and Evolution (also BIOES 275 and NS 275) (I)
Fall. 3 credits. Not offered 2001–2002.]

B. Culture and History:

ANTHR 100 Introduction to Archaeology (also ARKEO 100) # @ (III or IV)
Fall. 3 credits. J. Henderson.
A broad introduction to archaeology—the study of material remains to answer questions about the human past. Case studies highlight the variability of ancient societies and illustrate the varied methods and interpretive frameworks archaeologists use to reconstruct them. This course can serve as a platform for both archaeology and anthropology undergraduate majors.

ANTHR 102 Introduction to Anthropology: The Comparison of Cultures @ (III)
Spring. 3 credits. Staff.
An introduction to cultural anthropology through ethnographies, or the descriptive accounts of anthropologists. Through readings and lectures, students acquaint themselves with a number of cultures from several parts of the world. The cultures range in form from those of small-scale tribal societies to those of state societies. Throughout the course, we attempt to make sense of exotic cultures in their own terms. Attention is focused on variation in cultural patterns as they are expressed in social, economic, and ritual practices. In this encounter, the principles of anthropology as a comparative enterprise that pose distinct cultural systems in relief are developed. Fiction, films, and exercises supplement the formal anthropological materials.

ANTHR 103 The Scope of Anthropology
Spring. 1 credit. Prerequisite: concurrent enrollment in or prior completion of ANTHR 101 or ANTHR 102.
S-U grades only. Staff.
For course description, see section I.A, Introductory Courses.

ANTHR 200 Cultural Diversity and Contemporary Issues @ (III)
Fall. 3 credits. A. Willford.
This course introduces students to the meaning and significance of forms of cultural diversity for understanding contemporary issues. Drawing from films, videos, and selected readings, students are confronted with different representational forms that portray cultures in various parts of the world and they are asked to critically examine their own prejudices as they influence the perception and evaluation of cultural differences. We approach cultures holistically, assuming the inseparability of economies, kinship, religion, and politics, as well as interconnections and dependencies between world areas (e.g., Africa, Latin America, the West). Among the issues considered: "political correctness" and truth; nativism and ecological diversity; race, ethnicity, and sexuality; sin, religion, and war; and global process and cultural integrity.

[ANTHR 202 Interpretive Archaeology (also ARKEO 202) (III)
Fall. 3 credits. Not offered 2001–2002.]

[ANTHR 215 Stone Age Art (also ARKEO 215) # (III)
Fall. 3 credits. Not offered 2001–2002.]

[ANTHR 240 Old World Prehistory (also ARKEO 240) # (III)
Fall. 3 credits. Not offered 2001–2002.]

II. Honors and Independent Study

ANTHR 483 Honors Thesis Research
Fall or spring. Credit and hours TBA. Prerequisite: consent of the Honors Committee. Staff.
Independent work under the close guidance of a faculty member selected by the student.

ANTHR 491 Honors Thesis Write-Up
Fall or spring. Credit and hours TBA. Staff.

ANTHR 497 Independent Study: Undergrad I
Fall or spring. Credit and hours TBA. Intended for undergraduate students only. Staff.
Independent reading course in topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

ANTHR 498 Independent Study: Undergrad II
Fall or spring. Credit and hours TBA. Intended for undergraduate students only. Staff.
For course description, see ANTHR 497, section I, Honors and Independent Study.

III. Anthropology Major Senior Seminars

In the senior year, all Anthropology majors are required to take one of the Anthropology Senior Seminars offered by the department (archaeologically oriented majors may substitute Approaches to Archaeology or Archaeological Research Design). These seminars are designed to provide broad integrating perspectives on the contemporary field of anthropology through the study of principal trends, contemporary issues, history, and so on.

ANTHR 422 Anthropology and Environment @ (III)
Fall. 4 credits. Limited to 15. Prerequisite: anthropology major or permission of instructor. A. Subramanian.
This course explores issues in the environment that anthropology addresses in unique ways. Topics include indigenous knowledge, intellectual property, local and global interrelations, ecotourism, cultural ecology, development and resistance, environmentalism, and cultural diversity framed in the context of extended case studies.

ANTHR 440 Ethnographic Approaches to Studying Professionals and Institutions (III)
Spring. 4 credits. D. Boyer.
Anthropological research on institutions and professions is a rapidly-expanding area of inquiry. Anthropology is broadening horizons of research on complex societies, social elites, and reflexivity. This mode of research has conceptual and methodological challenges all its own, some of which require rethinking or adapting the "traditional" armature of anthropological theory and field research. For example, how can anthropological theories of language and culture be made helpful/relevant to understanding the everyday life of institutions and the social subjectivity of professionals? How can ethnographers gain access to institutions (such as consulting and advertising firms, for example) where logics of proprietary knowledge are paramount? This course reviews past and present ethnography on professionals and institutions with special attention to what conceptual paradigms and methods are suitable to the objects of inquiry.

ANTHR 480 Anthropology and Globalization (also ANTHR 680) (III)
Fall. 4 credits. A. Willford.
This course examines anthropological perspectives on globalization and assesses the cultural, political, and social implications of contemporary global processes. In exploring the factors that contribute to the production of diasporic consciousness, the intensity and variety of transnational flows of culture, commodities, corporations, and people are considered in order to assess challenges these processes pose to the modern nation-state. Has culture been liberated from the control of the nation-state through the emergence of new cultural networks created by immigration, electronic media, tourism, and multinational corporations and organizations? Or has the acceleration of global processes in the modern world system created new tools of domination within an increasingly stratified global economy? This course addresses these and related questions utilizing both anthropological theories of and ethnographic studies on globalization, ethnicity, diaspora, and nationalism.

ANTHR 490 Topics on Primates and Evolution: The Evolution of Language
Spring. 4 credits. Limited to 12. Prerequisite: ANTHR 390 or permission of instructor. A. Clark Arcadi.
This seminar begins by examining general theoretical issues in the study of animal communication: What is the function of communication? How do signalers and receivers benefit from communicative interactions? The focal behavior of our nearest relatives, the primates, is then examined. Emphasis is placed on areas relevant to human language: are primate signals learned? Do they have seminatic content? Are they assembled syntactically? What do they tell us about primate cognition? Finally, distinguishing features of language, as both a highly structured system and a social behavior, are considered from the point of view of evolution: Did language evolve from a primate focal communication system? Is there fossil and/or symbolic evidence for the origin of language? What does language tell us about human cognition?

[ANTHR 490 Topics on Primates and Evolution: Evolutionary Medicine
Spring. 4 credits. Not offered 2001–2002.]

IV. Nature and Culture

Thinking about nature and culture and their interaction is central to contemporary anthropology. The courses in this section present a biological and evolutionary perspective on behavior, focus on the interplay between nature and culture, and discuss the controversies surrounding these relationships between these dimensions of human life.

[ANTHR 208 The Evolution of Human Mating (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 211 Nature and Culture @ (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 242 Early Agriculture @ # (III)
Spring. 3 credits. Not offered 2001–2002.]

[ANTHR 344 Male and Female in Chinese Culture and Society (also WOMNS 344) @ (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 370 Environmental Archaeology (also ANTHR 670 and ARKEO 370/670) (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 371 Human Paleontology (also BIOEE 371) (I)
Fall. 4 credits. Prerequisite: one year of introductory biology or ANTHR 101 or permission of instructor. Lecs, M W F 2:30; lab, 1 hour each week TBA; occasional field trips. Offered alternate years. K. A. R. Kennedy.
A broad survey of the fossil evidence for human evolution with special attention to skeletal and dental anatomy, geological contexts, paleoecology, dating methods, archaeological associations, and current theories of human origins and physical diversity.

[ANTHR 372 Hunters and Gatherers (also ANTHR 672) # @ (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 375 Evolutionary Theory and Human Behavior (also ANTHR 675) (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 390 Primate Behavior and Ecology (I Supplementary List)
Spring. 4 credits. Prerequisite: ANTHR 101 or permission of instructor. A. Clark Arcadi.
The course investigates all aspects of non-human primate life. Based on the fundamentals of evolutionary theory, group and inter-individual behaviors are presented. In addition, an understanding of group structure and breeding systems is reached through an evaluation of ecological constraints imposed on primates in different habitats. Subjects include: primate taxonomy, diet and foraging, predation, cooperation and competition, social ontogeny, kinship, and mating strategies.

[ANTHR 409 Approaches to Archaeology (also ANTHR 609 and ARKEO 409/609) (III)
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 422 Anthropology and Environment @ (III)
Fall. 4 credits. Limited to 15 students. Prerequisite: anthropology major or permission of instructor. D. Holmberg.
For course description, see section III, Anthropology Major Senior Seminars.

ANTHR 490 Topics on Primates and Evolution: The Evolution of Language
Spring. 4 credits. Limited to 12. Prerequisite: ANTHR 390 or permission of instructor. A. Clark Arcadi.
For course description, see section III, Anthropology Major Senior Seminars.

[ANTHR 490 Topics on Primates and Evolution: Evolutionary Medicine
Spring. 4 credits. Not offered 2001–2002.]

V. Human History and Archeology

Archaeology tells the story of human origins, the invention of farming and settled life, the rise of complex social institutions and technologies, and the worldviews of the past, while also teaching field and laboratory methods for uncovering the human past.

[ANTHR 203 Early People: The Archaeological and Fossil Record (also ARKEO 203) # (III)
Spring. 3 credits. Not offered 2001–2002.]

[ANTHR 215 Stone Age Art (also ARKEO 215) # (III)
Fall. 3 credits. Not offered 2001–2002.]

[ANTHR 240 Old World Prehistory (also ARKEO 240) # (III)
Fall. 3 credits. Not offered 2001–2002.]

[ANTHR 242 Early Agriculture @ # (III)
Spring. 3 credits. Not offered 2001–2002.]

[ANTHR 317 Stone Age Archaeology (also ARKEO 317) (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 355 Ancient Mexico and Central America (also ARKEO 355) @ # (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 370 Environmental Archaeology (also ANTHR 670 and ARKEO 370/670) (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 371 Human Paleontology (also BIOES 371) (I)
Fall. 4 credits. Prerequisite: one year of introductory biology or ANTHR 101 or permission of instructor. Lecs, M W F 2:30; lab, 1 hour each week, TBA; occasional field trips. Offered alternate years.
K. A. R. Kennedy.
For course description, see section IV, Nature and Culture.

[ANTHR 372 Hunters and Gatherers (also ANTHR 672) # @ (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 405 Archaeological Research Design (also ANTHR 605 and ARKEO 405/605) (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 409 Approaches to Archaeology (also ANTHR 609 and ARKEO 409/609) (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 456 Mesoamerican Religion, Science, and History @ # (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 458 Archaeological Analysis (also ANTHR 658 and ARKEO 458/658) (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 459 Archaeology of the Household (also ANTHR 659 and ARKEO 459/659) # (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 463 Zooarchaeological Method (also ARKEO 463) (III)
Fall. 5 credits. Not offered 2001–2002.]

[ANTHR 464 Zooarchaeological Interpretation (also ARKEO 464) (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 466 Humans and Animals (also ANTHR 666 and ARKEO 466/666) # (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 467 Origins of Agriculture (also ARKEO 467) # (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 469 Gender and Age in Archaeology (also ANTHR 669, ARKEO 469/669) # (III)
Spring. 4 credits. N. Russell.
In recent years, feminist theory has begun to have an impact on archaeological thought. It is now recognized that gender is likely to have been a relevant dimension of social organization in past societies. Some archaeologists are also trying to take into account the differing interests and experiences of children, adults of reproductive age, and the elderly. This course is not limited to any period or geographical area, but ranges widely in examining how feminist theory has been applied to archaeological data and models. We consider whether it is necessary to identify women and men, adults and children in the archaeological record in order to take gender and age into account. We also examine the uses of archaeological data by contemporary feminists.

[ANTHR 493 Seminar in Archaeology (also ARKEO 493)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 494 Seminar in Archaeology: The Archaeology of Human Origins (also ARKEO 494)
Fall. 4 credits. Not offered 2001–2002.]

VI. Anthropological Thought and Method

As a form of inquiry, anthropology has a long and complex history and utilizes a wide variety of theories and methods. In this section, topics in the history of anthropological thought and numerous anthropological approaches are presented, along with courses focused on the design of anthropological research projects.

[ANTHR 215 Stone Age Art (also ARKEO 215) # (III)
Fall. 3 credits. Not offered 2001–2002.]

ANTHR 291 Filming Other Cultures (also ANTHR 691 and THETR 291/691) @ (III)
Spring. 4 credits. Limited to 20 students. Preference given to students who have taken either ANTHR 102 or THETR 474. Fee for film screening and maintenance, $35. R. Ascher.
Shortly after the first films were screened, their makers saw in motion pictures a promise for greater understanding among peoples. Was the promise fulfilled? In this discussion course, responses to this question are examined through the study of short, representative films and related readings. The discussions are framed and informed by ideas from anthropology and film studies. For example, we consider: aesthetics, ethics, and responsibility in filming and editing; connections between sound—or lack of it—and image; the implications of film as a product of Euroamerican culture; cultural assumptions in camera movements, film color, and film pace; indigenous people's presentations of themselves and Euroamerican representations of others; and the blurry, ever- changing space that separates fiction from nonfiction film. For one meeting each week, two students, in cooperation with the instructor, are responsible for leading the discussion.

[ANTHR 306 Ethnographic Description (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 324 Anthropology Amongst the Disciplines (III)
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 362 Democratizing Society: Participation, Action, and Research (also ANTHR 662) (III)
Fall. 4 credits. D. J. Greenwood.
This course poses an alternative to distanced, "objectivist" social science by reviewing some of the numerous approaches to socially engaged research. Among the approaches discussed are those centering on the pedagogy of liberation, feminism, the industrial democracy movement, "Southern" participatory action research, action science, and participatory evaluation. There are no prerequisites and undergraduates are welcome.

ANTHR 368 Marx: An Overview of His Thought (also ANTHR 668) (III)
Spring. 4 credits. T. Turner.
A reading and interpretation of Marx's principal writings, emphasizing both the continuities and the changes from his earlier to his later works, with attention given to contemporary developments and controversies in Marxian scholarship.

[ANTHR 372 Hunters and Gatherers (also ANTHR 672) # @ (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 403 The Craft of Anthropology: Ethnographic Field Methods (also ANTHR 603) (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 405 Archaeology Research Design (also ANTHR 605 and ARKEO 405/605) (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 412 Contemporary Anthropological Theory (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 420 Development of Anthropological Thought (III)
Spring. 4 credits. J. Fajans.
An examination of the history and development of anthropological theory and practice. The course focuses on the differences and continuities among the various national and historical approaches that have come to be regarded as the schools of anthropology.

[ANTHR 453 Visual Anthropology (IV)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 458 Archaeological Analysis (also ANTHR 658 and ARKEO 458/658) (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 459 Archaeology of the Household (also ANTHR 659 and ARKEO 459/659) # (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 463 Zooarchaeological Method (also ARKEO 463) (III)
Fall. 5 credits. Not offered 2001–2002.]

[ANTHR 464 Zooarchaeological Interpretation (also ARKEO 464) (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 466 Humans and Animals (also ANTHR 666 and ARKEO 466/666) # (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 467 Origins of Agriculture (also ARKEO 467) # (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 474 Laboratory and Field Methods in Human Biology (also BIOES 474) (I)
Spring. 5 credits. Not offered 2001–2002.]

ANTHR 480 Anthropology and Globalization (also ANTHRO 680) (III)
Fall. 4 credits. A. Willford.
For course description, see section III, Anthropology Major Senior Seminars.

ANTHR 487 Field Research Abroad @ (III)
Fall or spring. Credit TBA. Intended for undergraduate students only. Staff.
Field research abroad as part of the Cornell-Nepal Studies Program, the Cornell-Honduras

Program, or other departmentally-approved programs. Topics are selected and project proposals prepared by students in consultation with faculty. Fieldwork typically involves extended research (usually four–six weeks) in a foreign setting with faculty supervision, culminating in a major paper or report.

[ANTHR 494 Seminar in Archaeology: The Archaeology of Human Origins (also ARKEO 494) (III)
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 495 Action Research Practicum
Fall and spring. 2 credits. Prerequisite: student must be holder of Bartels Action Research Undergraduate Fellowship.
D. Greenwood.
The Henry E. Bartels Undergraduate Action Research Fellowship Program offers opportunities for Cornell University undergraduate students from all colleges, departments, and majors to engage in action research projects in the local community, including the Ithaca area and the Cornell campus community. This is a two-part course.

VII. Understanding Cultures

Anthropologists examine the diversity of human behaviors, social relationships and structures, economies, political and legal orders, worldviews, logics, languages, symbols, myths, and religions among the many other means human beings invent to create and reproduce social life around the world. Anthropologists work from a holistic perspective to account for differences and similarities across cultures. Anthropologists also take small-scale societies and local sociocultural systems as the object of analysis. They collect data primarily through ethnographic fieldwork, that is, months or years of participating in and observing of the societies they study. Anthropologists see inherent linkages between the practical and the meaningful dimensions of human existence.

A. Anthropological Approaches to Economy, Society, Law, and Politics:

The courses below take as their starting point what are usually defined as the social, political, legal, and economic practices and structures of human life and show how they are shaped culturally and how they shape culture.

[ANTHR 217 Nationalism and Revivalism (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 305 Emotion, Gender, and Culture (also WOMNS 305) @ (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 313 Anthropology of the City @ (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 321 Sex and Gender in Cross-Cultural Perspective (also ANTHR 621 and WOMNS 321/631) @ (III)
Fall. 4 credits. D. Doukas.
An introduction to the study of sex roles cross-culturally and to anthropological theories of sex and gender. The course examines various aspects of the place of the sexes in social, political, economic, ideological, and biological systems to emphasize the diversity in gender and sex-role definitions around the world.

ANTHR 323 Kinship and Social Organization (III)
Spring. 4 credits. B. Lambert.
Much of this course is a survey of forms of the family, descent groups, and marriage systems. The role of age and sex in the social structure is also considered. The last part of the course is devoted to a history of the British and American family and to its fate in utopian communities.

[ANTHR 326 Economic Anthropology (III)
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 328 Conflict, Dispute Resolution, and Law in Cultural Context (III)
Fall. 4 credits. V. Santiago-Irizarry.
Rule-making and dispute resolution are integral aspects of social reality in any culture. The ways in which conflict is treated and interpreted—to be then deflected or resolved—articulate with other cultural domains such as religion, politics, and economics as part of the material and symbolic processes that enable sociocultural interaction. At issue then are the formal and processual means that the treatment of conflict takes in different societies. These means constitute frames for the definition of social experience that are used by social factors in the interpretation of events within the terms of an overriding sociocultural logic that is in turn refigured by these interpretive frames.

[ANTHR 380 State, Nation, and Everyday Life (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 385 The Anthropology of Intellectuals (III)
Fall. 4 credits. D. Boyer.
This course offers a review of anthropological research on intellectuals (or "knowledge-specialists") and on social practices of knowledge-making. The question of how social knowledge is articulated, standardized, and reproduced has become an area of renewed interest across the social sciences since the 1970s. Reflexive social science has been especially interested in understanding how social and cultural knowledges are created, by whom, and for what purposes. These questions actually have a substantial heritage and the course begins with a review of classic sociological and anthropological theories of intellectuals and their role(s) in society. Then the course explores both classic and contemporary ethnographies of knowledge-specialists and knowledge-making with a special focus on the relationship between intellectuals and the creation of cultural order. Finally, the course discusses the possibly changing role of intellectuals in contemporary western "knowledge societies."

ANTHR 415 Creolization, Syncretism, and Hybridity (also S HUM 415) (III)
Spring. 4 credits. V. Munasinghe.
The concepts of Creolization, Syncretism, and Hybridity all convey a state of 'mixture' that assumes a diasporic situation. This course explores theories and empirical case studies of processes of racial, cultural and religious mixture from an inter-disciplinary perspective. The course explores the interconnections among concepts denoting 'mixture' that have diverse originary points. The overarching line of inquiry is to explore the genealogies of the three concepts as a necessary precursor to understanding how these terminologies may, in concert, illuminate different aspects of the dynamics structuring processes of mixture in different historical and ethnographic settings.

ANTHR 422 Anthropology and Environment @ (III)
Fall. 4 credits. Prerequisite: anthropology major or permission of instructor.
D. Holmberg.
For course description, see section III, Anthropology Major Senior Seminars.

[ANTHR 426 Ideology and Social Reproduction (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 429 Anthropology and Psychoanalysis @ (III)
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 440 Ethnographic Approaches to Studying Professionals and Institutions (III)
Spring. 4 credits. D. Boyer.
For course description, see section III, Anthropology Major Senior Seminars.

[ANTHR 460 Culture and International Order (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 479 Ethnicity and Identity Politics: An Anthropological Perspective (III)
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 485 Mothers, Priests, Rebels, and Indian Chiefs: New Social Movements in Latin America (also ANTHR 685) @ (III)
Spring. 4 credits. B. J. Isbell.
Latin America is characterized today as a region of widespread yet diverse forms of mobilization that appear to be in constant transformation. The "Mad Mothers" of Argentina, indigenous environmentalists, liberation theologists, revolutionaries, ethnic leaders, gay activists, and urban squatters are challenging historicity, engaging in cultural innovation, and articulating in diverse ways with the state and national cultures. This seminar charts a course between theoretical texts on power and mobilization and examples of ethnography/historical cases of social movements.

B. Interpretive Approaches in Cultural Anthropology:

These courses stress symbolic or textual approaches to human society. They take as their object of analysis structures of meaning in such diverse areas as performance and text, myth and religion, views of the self, gender, and the sociology of knowledge. These same topics arise in many of the area-focused courses as well (Section D), but take center stage in the following courses.

ANTHR 232 Media, Culture, and Society (III)
Spring. 3 credits. D. Boyer.
This course provides an introduction to understanding the relationship between media and culture from an anthropological perspective. The primary goal of the course is to help students develop an ethnographic awareness of the complex factors influencing mass media production, representation, and reception. We work toward this goal by studying how media technologies effect the representation and reproduction of cultural identities, how mass media representations mediate the negotiation of national identities and moralities, how institutional situations and professional practices influence media production, and

how state and market forces both create and restrict possibilities of media expression. A wide range of social and historical cases are covered by both readings and lectures. Course materials include print, visual, and electronic media. Course assignments encourage students to engage the contemporary American media both analytically and critically.

ANTHR 250 The Anthropology of Food and Cuisine (III)
Spring. 4 credits. J. Fajans.
You are what you eat! This course examines the way food is produced, prepared, exchanged, presented, and given meaning in cultures around the world. It examines the symbolism of specific foodstuffs. Who prepares food and how it is done? Who feeds whom and how these relations are expressed and valued? In addition to looking at these questions we analyze ideas about commensality; how food is used in public contexts for presentation or exchange, and how food is a marker of gender, class, status, ethnicity, and identity. In addition to looking specifically at food, we analyze cultural ideas about gender, the body, and identity in terms of how these cultural patterns are produced and expressed through concrete activities like eating, fasting, and special diets. In this class we stress critical and comparative thinking about subjects we tend to take for granted.

ANTHR 291 Filming Other Cultures (also ANTHR 691 and THETR 291/691) @ (III)
Spring. 4 credits. Limited to 20 students. Preference given to students who have taken either ANTHR 102 or THETR 474. Fee for film screening and maintenance, $35. R. Ascher.
For description, see section VI, Nature and Culture.

ANTHR 320 Myth, Ritual, and Symbol (also RELST 320) @ (III)
Spring. 4 credits. D. Holmberg.
This course examines how systems of thought, symbolic forms, and ritual practice are formulated and expressed in primarily non-Western societies. It focuses on anthropological interpretations of space, time, cosmology, myth, classificatory systems (such as color, totems, food, dress, kinship), taboos, sacrifice, witchcraft, sorcery, and rites of passage (birth, initiation, marriage, death). Examines both the roles of specialists (spirit mediums, curers, priests, ascetics, etc.) and nonspecialists in producing these cultural forms.

[ANTHR 322 Magic, Myth, Science, and Religion (also RELST 322) @ (III)
Fall. 3 credits (4 by arrangement with instructor). Not offered 2001–2002.]

[ANTHR 379 Culture, Language, and Thought (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 381 Anthropology and Religion (also RELST 381) @ (III)
Fall. 4 credits. A. Willford.
This course approaches the study of religion from an anthropological perspective. The centrality and universality of religion in social life has been fundamental in the development of social and cultural theory. We begin by examining the classic theories of religion in the works of Durkheim, Marx, Weber, and Freud, followed by an exploration of how these theories have been influential in anthropological studies of cosmology, ritual, selfhood, myth, sorcery, witchcraft, and pilgrimage. We conclude by examining the apparent persistence, revival and transformation of religious beliefs and practices within modern and modernizing states. This leads us to ask whether an increasing politicization and globalization of religious ideology poses significant challenges to the anthropological analysis of religion.

[ANTHR 406 The Culture of Lives (also WOMNS 406) @
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 408 Gender Symbolism (also WOMNS 408) @ (IV)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 410 Cross-Culturality in the Caribbean (also S HUM 420) (III)
Spring. 4 credits. S. Shukla.
This seminar takes as its inspiration the literary and sociopolitical imagination of Guyanese writer Wilson Harris, described as "cross-culturality." Here, the model of diversity being elaborated is rather different from the multiculturalism we are familiar with, in the United States (or Britain or Canada, for that matter), where cultures are seen to function as discrete parts of the whole. Cross-culturality presumes that individual ethnic or racial cultures are partial and reinvent themselves through dialogues with other cultures. Perhaps this broad and flexible conception can only emerge from the Caribbean, a hyper-theorized space of hybridity. But is this because the constitutive ideas of race, nation, and migration, are different in West Indian countries from those that operate in the North American context? Can they be traced historically, in relation to political developments, of colonialism, historically, in relation to political developments, of colonialism, postcolonialism and regionalism? And what happens to these concepts when they move across the border of the nation-state?

[ANTHR 432 Culture and Performance and Performing Culture @ (IV)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 453 Visual Anthropology (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 456 Mesoamerican Religion, Science, and History @ # (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 460 Culture and International Order (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 469 Gender and Age in Archaeology # (III)
Spring. 4 credits. Not offered 2001–2002.]

C. Cultures in Anthropological Perspective:

Anthropology constructs its theories in the comparison of different social and cultural systems and thus depends integrally on knowledge about particular places. The courses below are all focused on the cultures and societies of particular areas of the world and organize knowledge about these areas in reference to key anthropological questions. Students without prior experience in anthropology are welcome in these courses.

[ANTHR 221 Anthropological Representation: Ethnographies on Latino Culture (also LSP 221 and AM ST 221) (III)
Fall. 3 credits. Not offered 2001–2002.]

ANTHR 224 The French Experience (also FRLIT 224) (III or IV)
Fall. 3 credits. J. Siegel, A. Berger.
An examination of French society, culture, and institutions. What has made French culture so distinctive? Its literature and its revolutions, its gastronomy and fashion, its painting, cathedrals and cinema. Looking attentively at texts, images, and contexts from selected moments in the eighteenth, nineteenth, and twentieth centuries, we attempt to unravel some of the defining enigmas of the French exeperience.

ANTHR 230 Cultures of Native North America @ # (III)
Fall. 4 credits. B. Lambert.
A survey of the principal Eskimo and American Indian culture areas north of Mexico. Selected cultures are examined to bring out distinctive features of the economy, social organization, religion, and worldview. Although the course concentrates on traditional cultures, some lectures and readings deal with changes in native ways of life that have occurred during the period of European-Indian contact.

ANTHR 301 Equality and Dominance—the U.S. Before 1900 (also AM ST 307) # (III)
Spring. 4 credits. D. Doukas.
This course uses historical ethnography—that is, applying anthropological insights to historical materials—for a searching investigation into the United States' past, from the indigenous peoples' fateful encounter with Europe to the social upheavals of the early corporate capitalist era. Focusing on primary sources and contextualizing them in the transnational processes of colonization, enslavement, and political-economic centralization, the course aims to avoid the extremes of triumphalism and anti-Americanism by approaching this past in terms of a constitutive tension between new ideals of equality and old habits of dominance and subordination.

ANTHR 303 Asians in the Americas: A Comparative Perspective (also AAS 303) (III)
Fall. 4 credits. A. Subramanian.
For description, see department website.

ANTHR 316 Power, Society, and Culture in Southeast Asia @ (III)
Spring. 4 credits. A. Willford.
Southeast Asia is a region where anthropologists have paid great attention to the symbolic within cultural and social processes. While this intellectual orientation has produced contextually rich accounts of cultural uniqueness, there has been a tendency within "interpretive" ethnographies to downplay the role of power and domination within culture and society. This course aims to utilize the traditional strengths of symbolic anthropology by examining the roles of ritual, art, religion, and "traditional" values within contemporary Southeast Asian societies. In so doing, however, we examine how these practices and ideas can also structure ethnic, class, and gender inequalities. Understanding how "traditional" cultural practices and ideologies fit within contemporary nation-states requires that we also examine the effects of colonialism, war, and nationalism throughout the region. In addition to providing a broad and comparative ethnographic survey of Southeast Asia, this course also investigates how culturally-specific forms of power and

domination are reflected in national politics and in local and regional responses to the economic and cultural forces of globalization.

[ANTHR 333 Ethnology of the Andean Region @ # (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 336 Change and Continuity in the Pacific Islands (III)
Fall. 4 credits. J. Fajans.
This course provides an introduction to the diverse peoples and cultures of Oceania, which extends from Hawaii to New Zealand and from Easter Island to New Guinea. It surveys the continuities and differences within this vast domain. The primary focus is on cultural diversity, linguistic patterns, history and migration, and ecological constraints and adaptations. The course examines issues confronting the contemporary Pacific nations: colonialism, development, nationalism, the politics of tradition, and how the world system influences events and politics in the region. This course is open to anyone interested in the Pacific region and/or in anthropology.

[ANTHR 337 Gender, Identity, and Exchange in Melanesia @ (III)
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 339 Peoples and Cultures of the Himalayas (also ANTHR 739) @ (III)
Spring. 4 credits. K. March.
A comprehensive exploration of the peoples and cultures of the Himalayas. Ethnographic materials draw on the lifeways of populations living in the Himalayan regions of Bhutan, India, Nepal, and Tibet. Some of the cultural issues to be examined through these sources include images of the Himalayas in the West, forms of social life, ethnic diversity, political and economic history, and religious complexity.

[ANTHR 344 Male and Female in Chinese Culture and Society (also WOMNS 344) @ (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 345 Japanese Society @ (III)
Fall. 4 credits. Not offered 2001–2002.

[ANTHR 350 Topics in the Anthropology of Europe (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 355 Ancient Mexico and Central America (also ARKEO 355) @ # (III)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 377 The United States (also LSP 377 and AM ST 377) (III)
Fall. 4 credits. V. Santiago-Irizarry.
The anthropological inquiry into one's own culture is never a neutral exercise. This course explores issues in the cultural construction of the United States as a "pluralistic" society. We look at the ideological context for the production of a cultural profile predicted upon ideas that are intrinsic to American images of identity such as individualism, freedom, and equality and the way these are applied in practice. The course readings include historic documents and accounts, popular writing, and recent ethnographies on the United States.

[ANTHR 405 Global Tokyo (also S HUM 404 and ASIAN 405) @ (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 413 Religion and Politics in Southeast Asia (also ASIAN 413) @ (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 444 Japanese Social Organization @ (III)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 456 Mesoamerican Religion, Science, and History @ # (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 477 Ethnology of Island Southeast Asia @ (III)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 493 Seminar in Archaeology (also ARKEO) (III)
Fall. 4 credits. Not offered 2001–2002.]

Relevant courses in other departments

BIOPL 247 Ethnobiology
Fall. 3 credits. D. M. Bates.

BIOPL 348 The Healing Forest
Spring. 2 credits. D. M. Bates.

MUSIC 103 Introduction to World Music: Africa and the Americas
Spring. 3 credits. M. Hatch.

MUSIC 104 Introduction to World Music: Asia
Fall. 3 credits. M. Hatch.

MUSIC 245 Gamelan in Indonesian History and Cultures
Fall or spring. 3 credits. M. Hatch.

NS 650 Food and Nutrition Assessment in a Social Context
Fall. 4 credits. D. Pelletier, G. Pelto.

NS 651 Food and Nutrition Action in a Social Context
Spring. 3 credits. D. Pelletier, G. Pelto.

VIII. Graduate Seminars

The graduate program in anthropology is described in much greater detail in the Graduate Program brochure which is available through the Director of Graduate Studies. This document is also found on the anthropology department web page at falcon.arts.cornell.edu/~anthro/. The seminars described immediately below pertain to the program in socio-cultural anthropology. For information about graduate study in archaeology and biological anthropology, see the anthropology department web page.

A core set of seminars is required of all graduate students in socio-cultural anthropology: ANTHR 600 and 601. ANTHR 603 is strongly recommended. These courses are open to graduate students from other related fields. This sequence, and the graduate curriculum in general, is premised on the idea that anthropology is best defined as the comparative study of human social life. This definition resists institutional pressures in the academy to distinguish social science from humanistic or cultural studies and scholarly from more worldly applications. Our most important method, ethnography, is at once scientific and humanistic; disciplinary aspirations refuse to view cultural interpretation and analytic explanation as separable values. Furthermore, theory in anthropology is directly related to practice in the world whether in relation to research or more action-oriented pursuits. Consequently, the core sequences as well as most other courses for graduate students are oriented explicitly toward subverting an ideological construction of social life as separable into cultural and social (or political-economic) domains.

ANTHR 600 Proseminar: Culture and Symbol
Fall. 6 credits. J. Fajans.
This course focuses on an appreciation of symbolic, expressive, and representational forms and processes both as producers and products of social activities. Through the study of symbolic anthropology, structuralism, exchange, myth and ritual, religion, gender, personhood, linguistics, semiology, etc., we investigate how identity and meaning are linked to the practical exigencies of social life. While emphasizing aspects of the discipline generally associated with cultural anthropology, the course endeavors to set the stage for a dialectical understanding of social, political, economic, and symbolic activities as interrelated phenomena. The works of de Saussure, Levi-Strauss, Dumont, Geertz, Victor Turner, Sahlins, among others, as well as contemporary theories are given careful attention.

ANTHR 601 Proseminar: Social Organization
Spring. 6 credits. T. Turner.
This course focuses on linkages between culture and social institutions, representations and practices. The nature of these linkages is debated from strongly contesting points of view in social theory (structuralist, poststructuralist, utilitarian, hermeneutic, Marxist). Unlike debates in critical theory where the form of contestation has been mainly philosophical, in anthropology, these issues have developed in ethnographic analyses. The course briefly surveys kinship theory and economic anthropology with a focus on implications for general issues in social theory. Discussion of attempts to develop dialectical syntheses around the motion of "practice" follows. The issues addressed in this section carry over into the next, colonialism and post-colonialism, in which poststructuralist readings of history are counterposed to Marxist ones. Finally, Lacanian and Marxist visions of ideology as they relate to anthropological theory and ethnographic analysis are examined with particular emphasis on the cultural and social production of persons.

[ANTHR 602 The Practices of Anthropology
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 604 Praxis and Culture
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 605 Archaeological Research Design (also ANTHR 405 and ARKEO 405/605)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 609 Approaches to Archaeology (also ANTHR 409 and ARKEO 409/609)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 610 Language and Myth
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 614 Reading in the Ethnographic Tradition (1880–1960)
Spring. 4 credits. D. Holmberg.
This seminar examines the development of the monographic tradition within American cultural anthropology and British social anthropology. We read "classic" ethnographic texts beginning with Cushing's writings in the late nineteenth century, following with works by anthropologists such as Rivers, Boas, Radcliffe-Brown, Malinowski, Firth, Mead, Bateson, Radin, Redfield, Srinivas, Evans-Pritchard, and Leach. We also read some of the more recent literature assessing ethnographic practice and writing. This seminar alternates from year to year with ANTHR 615.

[ANTHR 615 Reading Contemporary Ethnographies (1960–1990)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 616 Cultural Production of the Person
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 621 Sex and Gender in Cross-Cultural Perspective (also ANTHR 321 and WOMNS 321/631)
Fall. 4 credits. Prerequisite: concurrent attendance in the lectures and films of ANTHR/WOMNS 321 and permission of instructor. D. Doukas.
For course description, see ANTHR 321, section VII.A, Understanding Cultures.

ANTHR 628 Political Anthropology
Fall. 4 credits. Prerequisite: a reading knowledge of Indonesian is required. J. Siegel.
A comparison of political rhetoric in the Indonesian Old and New Orders. The bearing of such phenomenon as newspapers, magazines, television, and various types of theater, music, and fiction on the shaping of accommodation or opposition to the political order is examined.

[ANTHR 629 Chinese Ethnology
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 632 Andean Symbolism
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 635 Southeast Asia: Readings in Special Problems
Fall or spring. Credit and hours TBA. Staff.
Independent reading course on topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

[ANTHR 636 Cognition and Classification
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 637 Theorizing Social Movements, Human Rights and Democracy in Latin America
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 638 Contemporary Gender Issues in the Americas (also WOMNS 638)
Spring. 4 credits. Prerequisite: knowledge of Spanish language required. B. J. Isbell.
This course provides a forum of comparison of contemporary gender issues in the Americas: the foci are on the United States and specific case studies in Latin America. Issues discussed are: globalization and more specifically the feminization of poverty and women's responses, gender rights and public policies; women's and children's health; and the construction of gender identity. The course also takes an historical perspective on the development of feminism and gender politics in specific countries that students are researching. Each student is responsible for in-depth research on specific issues in a particular country or countries.

[ANTHR 639 The Feminine Symbolic
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 641 South Asia: Readings in Special Problems
Fall or spring. Credit and hours TBA. Staff.
Independent reading course in topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

ANTHR 644 Research Design
Spring. 4 credits. A. Subramanian.
This seminar focuses on preparing a full-scale proposal for anthropological fieldwork for a dissertation. Topics include: identifying appropriate funding sources; defining a researchable problem; selecting and justifying a particular fieldwork site; situating the ethnographic case within appropriate theoretical contexts; selecting and justifying appropriate research methodologies; developing a feasible timetable for field research; ethical considerations and human subjects protection procedures; and preparing appropriate budgets. This is a writing seminar; students complete a proposal suitable for submission to a major funding agency in the social sciences.

[ANTHR 645 Japanese Ethnology
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 647 Death of the Father
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 648 Marriage and Death
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 649 Narrative and the Analysis of Culture
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 653 Myth Onto Film (also THETR 653)
Spring. 4 credits. Enrollment limited by available studio space and equipment. Prerequisite: some knowledge of one of the following: anthropology, filmmaking, mythology, graphics, drawing, or painting is required. Open to undergraduates and graduate students with permission of instructor. Fee for film screening and maintenance, $50. R. Ascher.
In myths, whales fly, pebbles throw themselves across streams, and trees are transformed into women. Toward the end of visualizing myths—in particular the myths of other people—we explore the possibilities of animated film. The technique used is cameraless animation; that is, we draw and paint, frame by frame, directly onto movie film. The intellectual problem is to visualize the myths of others so that they are comprehensible to us but are not thought to be of us. Reading includes introductory works on both myth and animation and there is background reading on the particular myth that is committed to film.

ANTHR 655 East Asia: Readings in Special Problems
Fall or spring. Credit and hours TBA. Staff.
Independent reading course in topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

[ANTHR 656 Maya History
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 658 Archaeological Analysis (also ANTHR 458 and ARKEO 458/658)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 659 Archaeology of the Household (also ANTHR 459 and ARKEO 459/659)
Fall. 4 credits. Not offered 2001–2002.]

[ANTHR 660 Language, Ideologies and Practices (also LSP 660)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 662 Democratizing Society: Participation, Action, and Research (also ANTHR 362)
Fall. 4 credits. D. J. Greenwood.
For description, see ANTHR 362, Section VI, Anthropological Thought and Method.

ANTHR 663 Action Research
Spring. 4 credits. D. Greenwood.
This seminar is a practicum in action research (AR) in which the semester becomes a self-managing learning environment for the exploration of the techniques and group processes involved in AR, including co-generative learning, searching, and AR facilitation. Participation in a seminar-centered LISTSERV on the Internet is expected.

ANTHR 665 Topics in Native American Societies and Cultures
Spring. 4 credits. B. Lambert.
This seminar is intended for undergraduate and graduate students in any field who are prepared to undertake independent research in American Indian Studies. I am particularly interested in how materials from Native American cultures can be used to help solve problems of general anthropological significance and in the contributions Native Americans have made to anthropological and sociological knowledge as teachers and researchers. However, students are encouraged to pursue their own interests and are expected to discuss work in progress with other members of the seminar. A reading list is developed to provide a shared background for discussions.

[ANTHR 666 Humans and Animals (also ANTHR 466 and ARKEO 466/666)
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 667 Contemporary Archaeological Theory (also ARKEO 667)
Spring. 4 credits. Prerequisite: undergraduates with permission of instructor only. N. Russell.
This course surveys recent developments and current debates in archaeological theory. This includes the processual/postprocessual debate and contrasts between scientific and humanistic approaches more generally, as well as other approaches (Marxist, feminist, etc.). We also discuss ethical concerns and engagements with groups outside archaeology with interests in the past.

ANTHR 668 Marx: An Overview of His Thought (also ANTHR 368)
Spring. 4 credits. T. Turner.
For course description, see section VI, Anthropological Thought and Method.

ANTHR 669 Gender and Age in Archaeology (also ANTHR 469 and ARKEO 469/669)
Spring. 4 credits. N. Russell.
For course description, see section V, Human History and Archaeology.

[ANTHR 670 Environmental Archaeology (also ANTHR 370 and ARKEO 370/670)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 671 Palaeoanthropology of South Asia (also BIOES 671 and ASIAN 620)
Fall. 3 credits. Not offered 2001–2002.]

[ANTHR 672 Hunters and Gatherers (also ANTHR 372)
Spring. 4 credits. Not offered 2001–2002.]

[ANTHR 673 Human Evolution: Concepts, History, and Theory (also BIOES 673)
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 680 Anthropology and Globalization (also ANTHR 480)
Fall. 4 credits. A. Willford.
For course description, see section VI, Anthropological Thought and Method.

[ANTHR 682 Perspectives on the Nation (also AAS 682)
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 685 Mothers, Priests, Rebels, and Indian Chiefs: New Social Movements in Latin America
Spring. 4 credits. B. J. Isbell.
For course description, see section VII.A, Understanding Cultures.

[ANTHR 690 Ritual and Myth: Structure, Process, Practice
Spring. 4 credits. Not offered 2001–2002.]

ANTHR 691 Filming Other Cultures (also ANTHR 291 and THETR 291/691)
Spring. 4 credits. Fee for film screening and maintenance, $35.
For description, see ANTHR 291 and THETR 291. Graduate students who register in this course attend the meetings of 291. In addition, they write in-depth studies of one or more films in consultation with the instructor.

[ANTHR 699 Current Fields in Biological Anthropology
Fall. 4 credits. Not offered 2001–2002.]

ANTHR 701 Independent Study: Grad I
Fall, spring. Credit and hours TBA.
Intended for graduate students only. Staff.
Independent reading course in topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

ANTHR 702 Independent Study: Grad II
Fall or spring. Credit and hours TBA.
Intended for graduate students only. Staff.
For course description, see ANTHR 701, section VIII, Graduate Seminars.

ANTHR 703 Independent Study: Grad III
Fall or spring. Credit and hours TBA.
Intended for graduate students only. Staff.
For course description, see ANTHR 701, section VIII, Graduate Seminars.

ANTHR 739 Peoples and Cultures of the Himalayas (also ANTHR 339)
Spring. 4 credits. K. March.
For course description, see section VII.C, Understanding Cultures.

ARABIC AND ARAMAIC

See under Department of Near Eastern Studies.

ARCHAEOLOGY

See under Special Programs and Interdisciplinary Studies.

ASIAN AMERICAN STUDIES

See under Special Programs and Interdisciplinary Studies.

ASIAN STUDIES

E. M. Gunn, chair (388 Rockefeller Hall, 255–5095); B. R. Anderson, I. Azis, J. Badgley, T. Bestor, D. Boucher, K. Brazell, R. Bullock, T. Chaloemtiarana, P. Chi, S. Cochran, A. Cohn, B. de Bary, H. Diffloth, M. Farooqi, S. Feldman, G. Fields, P. Gellert, D. Gold, M. Hatch, R. Herring, S. Hoare, D. Holmberg, N. Jagacinski, Y. Katagiri, M. Katzenstein, Y. Kawasaki, K. A. R. Kennedy, J. V. Koschmann, F. Kotas, S. Kuruvilla, J. M. Law, T. Loos, T. Lyons, B. G. MacDougall, K. March, K. McGowan, R. McNeal, F. Mehta, T. L. Mei, C. Minkowski, S. Mohanty, V. Munasinghe, N. Nakada, Y. Nakanishi-Whitman, V. Nee, A. Nussbaum, S. Oja, A. Pan, C. A. Peterson, J. R. Piggott, T. Poleman, A. Riedy, N. Sakai, C. Salomon, P. S. Sangren, K. Selden, M. Shin, Y. Shirai, V. Shue, J. T. Siegel, R. J. Smith, R. Sukle, H. Tao, K. Taylor, Q. Teng, E. Thorbecke, T. Tranviet, S. Tun, N. Uphoff, D. X. Warner, J. Whitman, L. Williams, J. U. Wolff, O. Wolters

The Department of Asian Studies encompasses the geographical areas of East Asia, South Asia, and Southeast Asia and offers courses in most of the disciplines of the social sciences and the humanities. Asian studies courses through the 400 level (ASIAN is the prefix) are taught in English and are open to all students in the university. Some of these courses may be counted toward majors in other departments; others fulfill the humanities distribution requirement. Courses listed under Asian Studies offered through other departments may fulfill distribution requirements in history, social sciences, and arts.

The Major

A student majoring in Asian studies normally specializes in the language and culture of one country and often chooses an additional major in a traditional discipline.

Majors complete two courses at the 200 level (a minimum of six credits with a grade of C or better) in one of the Asian languages offered at Cornell. The major consists of at least 30 additional credits (which may include up to six credits of further language study) selected by the student in consultation with his or her adviser from among the courses listed under the Department of Asian Studies and numbered 250 and above.

The applicant for admission to the major in Asian studies must have completed at least one area studies course selected from among those listed under the Department of Asian Studies and must receive permission for admission to the major from the director of undergraduate studies. The student must have received a minimum grade of C in this course and in all other courses counted toward the major.

Honors

To be eligible for honors in Asian studies, a student must have a cumulative grade average of A- in all Asian studies area courses, exclusive of language study only, and must successfully complete an honors essay during the senior year. Students who wish to be considered for honors should apply to the director of undergraduate studies during the second term of their junior year. The application must include an outline of the proposed project and the endorsement of a supervisor chosen from the Asian studies faculty. During the first term of the senior year the student does research for the essay in conjunction with an appropriate Asian studies course or ASIAN 401. By the end of the first term the student must present a detailed outline of the honors essay or other appropriate written work and have it approved by the project supervisor and the director of undergraduate studies. The student is then eligible for ASIAN 402, the honors course, which entails writing the essay. At the end of the senior year, the student has an oral examination (with at least two faculty members) covering both the honors essay and the student's area of concentration.

Concentration in East Asia Studies

A candidate for the Bachelor of Arts degree at Cornell may take a concentration in East Asia studies by completing at least 18 credits of course work.

Students normally take five courses in East Asian studies at the 200 level or above from those East Asian courses listed (China, Japan, Korea) either under Asian Studies or Asian-related courses. Of these, two courses might be Asian language courses at the 200-level or beyond. East Asian graduate courses may also be offered for the concentration, as well as East Asia–related courses with a research paper on an East Asian topic. Appropriate courses taken through Cornell Abroad in East Asia may also be counted toward the concentration. Students concentrating in East Asian studies should select an adviser from the East Asia Program faculty for consultation on their course of study. For more information, contact the Asian Studies Department at 388 Rockefeller Hall, (607) 255–5095.

Concentration in South Asia Studies

A candidate for the Bachelor of Arts or Science degree at Cornell may take a concentration in South Asian studies by completing at least 18 credits of course work in South Asian studies, including ASIAN 215 (Introduction to South Asia) and four courses or seminars at the intermediate or advanced levels, two of which may be South Asian language courses.

Students taking a concentration in South Asian studies are considered members of the South Asia Program and will have an adviser from the program faculty. (This adviser will be for the student's concentration and is not a substitute for a student's academic adviser in his or her major.)

One South Asian graduate course may be taken for the concentration with consent of both the instructor and the adviser. The same applies for one South Asia-related course with a research paper on a South Asian subject. Additional courses may be added if offered with comparable South Asia content.

Concentration in Southeast Asia Studies

A candidate for the Bachelor of Arts or Science degree at Cornell may take a concentration in Southeast Asian studies by completing 18 credits of course work. A recommended plan would include ASIAN 208 and four courses at the intermediate or advanced stage, two of which could be a Southeast Asian language. Students taking a concentration in Southeast Asian studies are members of the Southeast Asia Program and are assigned an adviser from the program faculty. Such students are encouraged to commence work on a Southeast Asian language either at the 10-week intensive courses offered by the Southeast Asia Studies Summer Institute (SEASSI) or by studying for one semester at IKIP Malang, Indonesia; Khon Kaen University, Thailand; or Hanoi University, Vietnam; fellowships are available for undergraduates through the Cornell Abroad Program.

Intensive Language Program (FALCON)

The FALCON Program offers intensive instruction in Japanese or Chinese. The program is still the only one in the world offering a full year of intensive instruction from the elementary level, except for the exclusive language schools of some government agencies. Students must formally apply to the program, but the application process is simple and admission is open to all students. (Applications available for FALCON from the administrative assistant, room 125 Rockefeller Hall, or visit our web site www.arts.cornell.edu/asian/falcon.htm and apply online.) Students may take the entire sequence of 160, 161, 162, or any other portion of the program if they have the necessary background (to be determined by a placement test). The courses are full-time intensive language study; the degree of intensity required does not allow students to enroll simultaneously in other courses or to work, except perhaps on weekends.

Study Abroad

Cornell is a member of the Inter-University Center for Japanese Language Studies in Yokohama, the Inter-University Board for Chinese Language Studies in Beijing (at Tsinghua University), and a member of the Council on International Educational Exchange offering study in China at Beijing University and Nanjing University. These centers offer training in both spoken and written forms of the languages. The Kyoto Center for Japanese Studies (KCJS) is an undergraduate program for students who wish to spend either one or two semesters in Kyoto, Japan studying the Japanese language as well as contemporary and traditional Japanese culture.

Cornell is a class-A member of the American Institute of Indian Studies, which offers fellowships in India for intensive language study in Hindi, Bengali, and Tamil.

Cornell and the central campus of the Nepalese national university—Tribhuvan—at Kirtipur, Kathmandu, cosponsor an academic semester or year in Nepal.

Other opportunities include a junior year abroad at IKIP-Malang, in Indonesia, or at the School of Oriental and African Studies, University of London. Many other options for study in Asia exist, including in Indonesia, Thailand, and Vietnam through the Council for International Educational Exchange. Undergraduates should consult Cornell Abroad; graduate students should inquire at the East Asia Program, the South Asia Program, or the Southeast Asia Program offices.

First-Year Writing Seminars

See John S. Knight Institute brochure for times, instructor, and descriptions.

General Education Courses

ASIAN 191 Introduction to Modern Asian History (also HIST 191) @ (III)
Fall. 4 credits. T. Loos, S. Cochran.
See HIST 191 for description.

ASIAN 192 Introduction to World Music: Asia (also MUSIC 104) @ (IV)
Fall. 3 credits. M. Hatch.
See MUSIC 104 for description.

ASIAN 203 Introduction to Comparative Literature (also COM L 203) (IV)
Fall. 4 credits. Team.
See COM L 203 for description.

[ASIAN 204 Global Fictions (also COM L 204) (IV)
Spring. 4 credits. Not offered 2001–2002. N. Melas.
See COM L 204 for description.]

[ASIAN 206 The Occidental Tourist: Travel Writing and Orientalism in Southeast Asia (also HIST 207) @ (III)
Spring. 4 credits. Not offered 2001–2002. T. Loos.]

ASIAN 208 Introduction to Southeast Asia @ (III or IV)
Spring. 3 credits. T. Chaloemtiarana.
This course is for anyone curious about the most diverse part of Asia; it defines Southeast Asia both as the nation-states that have emerged since 1945 (Brunei, Burma, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Viet Nam) and as a larger cultural world extending from southern China to Madagascar and Polynesia. Students find a serious, organized introduction to a variety of disciplinary and topical approaches to this region, including geography, linguistics, history, religion and ideology, anthropology, marriage and family systems, music, literacy and literature, art and architecture, agriculture, industrialization and urbanization, politics and government, warfare and diplomacy, ecological and human degradation, and business and marketing. The course teaches both basic information and different ways of interpreting that information.

ASIAN 211 Introduction to Japan: Japanese Texts in History @ # (IV)
Fall. 3 credits. B. deBary.
An interdisciplinary introduction to Japanese Studies especially designed for nonmajors. The course takes up a diverse series of cultural artifacts and demonstrates how, against the background of simultaneous and successive rises and falls of polities on the Japanese archipelago, the meanings and readings generated by these artifacts have changed dramatically over time. We consider verbal and visual, fictional and historical, canonical and noncanonical texts, including the eighth century *Kojiki*, the courtly narrative *Tale of Genji*, eighteenth century puppet theater, modern Ainu autobiography, and films and comic books dealing with themes of nuclear warfare and apocalypse.

ASIAN 212 Introduction to China @ # (IV)
Spring. 3 credits (4 credits with a special project; consult instructor for information). R. McNeal.
An interdisciplinary introduction to Chinese culture especially designed for students not majoring in Asian Studies.

ASIAN 215 Introduction to South Asian Civilization @ (IV)
Fall. 3 credits. C. Minkowski.
An interdisciplinary introduction to the culture and history shared by India and other states of South Asia. Designed for students not majoring in Asian Studies. Guest lecturers provide the perspective of their disciplines to the general themes of the course: cultural diversity and the role of tradition in contemporary life.

ASIAN 218 Introduction to Korea (also HIST 218 and GOVT 218) @ (IV)
Fall or spring. 3 credits. Staff.
An interdisciplinary introduction to Korean history and culture, including: geography, ethnography, language, literature, philosophy, religion, political economy, government, music, and art (sculpture, architecture, and painting). Includes an overview of Korean history from the Three Kingdoms Period to the present, focusing on the March 1, 1919 Independence Movement, the Korean War, the 1960 Student Revolution, the 1980 Kwangju Massacre, and other events.

Asia—Literature and Religion Courses

The following courses are taught entirely in English and are open to any Cornell student.

ASIAN 245 Gamelan in Indonesian History and Cultures (also MUSIC 245) @ (IV)
Fall or spring. 3 credits. M. Hatch.
See MUSIC 245 for description.

ASIAN 249 Peddlers, Pirates and Prostitutes: Subaltern Histories of Southeast Asia, 1800–1900 (also HIST 249/648) @ # (III)
Spring. 4 credits. E. Tagliacozzo.
See HIST 249 for description.

ASIAN 250 Introduction to Asian Religions (also RELST 250) @ # (IV)
Spring. 3 credits. D. Boucher.
This course explores a range of religious traditions in South Asia (Pakistan, India, and Sri Lanka) and East Asia (China and Japan) including Hinduism, Buddhism (South and East Asian), Confucianism, Daoism, and Shinto. We concentrate on these religions in traditional times in order to understand better the historical foundations that have influenced much of what these cultures are today. We attempt to inquire collectively into the nature of religious impulses among peoples who are in some fundamental ways both very much like us and very much different from us. The course format includes lectures and discussion sections.

ASIAN 277 Meditation in Indian Culture @ # (IV)
Spring. 3 credits. D. Gold.
This course probes the truths behind traditional claims of the priority of internal practice in Indian traditions. We examine both practices themselves—techniques of meditation and contemplation, religious ways of using intellect, forms of chant and ritual—and the dynamics through which these have left a wider mark on South Asian civilization. These dynamics include not only the evident reverberations of practice in philosophical reflection and socioreligious institutions, but also wide-ranging processes of stylization, elaboration, and popularization found throughout South Asian culture. In order to get a sense of the experiences treated in classical religious texts, students will be expected to experiment with some basic meditation practices. At least as important for the work of the course (and much more important for the grade) are the ways in which students situate these practices within larger South Asian world views as suggested by doctrines, rituals, iconic forms, and literary texts. To keep the interaction between internal practice and broader world views central, we will examine both Hindu and Buddhist sources, consistently examining the ways in which similar practices are given distinct shapes by the two religious traditions.

ASIAN 284 Southeast Asia in the World System: Capitalism and Incorporation, 1500-Present (also HIST 284) @ # (III)
Fall. 4 credits. E. Tagliacozzo.
See HIST 284 for description.

ASIAN 294 History of China in Modern Times (also HIST 294) @ (III)
Spring. 4 credits. S. Cochran.
See HIST 294 for description.

ASIAN 297 Japan Before 1600 (also HIST 297) @ # (III)
Fall. 4 credits. J. Piggott.
See HIST 297 for description.

ASIAN 298 The U.S.-Vietnam War (also HIST 289) (III)
Fall. 3 credits. K. Taylor.
This is a survey of events in Vietnam, the US, and elsewhere related to US intervention in Vietnam from the 1940s to 1975. Readings include historical narratives, memoirs, and literature. Alternative ways of understanding this war in the context of Vietnamese and American history will be explored.

[ASIAN 299 Buddhism (also RELST 290) @ # (IV)
Fall. 4 credits. Not offered 2001–2002.
D. Boucher.
This course explores the Buddhist tradition from its origins in ancient India to its migrations throughout Asia and eventually to the West. The first half of the course deals with Indian Buddhism: the Buddha, the principal teachings and practices of his early followers, and new developments in spiritual orientation. We then turn to the transmission of Buddhism to Central and East Asia, including China, Japan, and Tibet, concentrating on those traditions in traditional times. From there we look at the southern migration to Sri Lanka and Southeast Asia and conclude with an examination of Buddhism in America.]

[ASIAN 301 Schools of Thought-Ancient China @ # (IV)
Spring. 4 credits. Not offered 2001–2002.
R. McNeal.
This course introduces students to China's most important early moral and political philosophers, such as Confucius, Laozi, and Sunzi, through readings in translation. We address the traditional conception of six schools of thought in ancient China as reflected in classical and modern historiography and examine newly discovered texts with an eye toward clarifying the relationships among early schools and their representatives.]

ASIAN 302 Art of War in Ancient China @ # (IV)
Winter only. 4 credits. R. McNeal. *Also fulfills Humanities requirement.*
Sun-tzu's *Art of War* is one of the most widely translated and circulated books of all time. Businessmen in Asia swear by it, professional coaches invoke it when planning strategy, and students of political science plumb its depths for timeless wisdom on how to defeat an enemy without taking to the battlefield. This class examines Sun-tzu's text in its historical context, along with several other early military and strategic works. We treat these works as a genre, and look for characteristic features of the genre that can be better understood by reading these texts not as manuals for modern-day success, but as a record of a complex and sophisticated conceptualization of the role of warfare and all its components in the broader mission of the state.

ASIAN 306 Zen Buddhism (also RELST 306) @ # (IV)
Spring. 4 credits. Prerequisites: any course in Buddhism or Asian Studies (Religious Studies) 250, or consent of the instructor. Graduate students can take this course for credit and sign up for an additional credit hour for an extra session. J. M. Law.
This course is an exploration of the Zen tradition, with a core focus on central religious, historical and aesthetic developments in Japan. The course begins by situating the rise of the Ch'an tradition in China and the development of the Northern and Southern Schools. In Japan, we look at the establishment of Zen in the Kamakura period, with a focus on the developments of both Rinzai and Soto Zen, with a focus on the early transmissions of Chinese texts and practices to Japan through Japanese emissaries. To understand the developments of these two schools, we will study the lives and writings of both Eisai (1146–1215) and Dôgen (1200–1253), and also explore how their life works and writings influenced later developments in Zen. We also explore the work of the Tokugawa Zen figure Hakuin (1686–1769). In the latter part of the class, we study the ways in which Zen has become implicated in Japanese postwar identity discourses, by focusing on a critical reading of the writings of D. T. Suzuki and other writings which create an aestheticism as a central component of Japanese national identity. Includes fieldtrips to some of the largest Zen monasteries in North America. Japanese readings are available to those able to read Japanese.

[ASIAN 311 Modern Korean Culture and Literature @ (IV)
Spring. 4 credits. Not offered 2001–2002.
Staff.
A survey of the literature of the Post-Liberation period (1945–present), with an emphasis on the development of modern Korean poetry and its relation to the intellectual history of this time. Students read major poetic texts of each period in English translation as well as writings on cultural movements and major arguments in intellectual history.]

ASIAN 312 Intellectuals in Early Modern Korea @ # (IV)
Fall. 4 credits. M. Shin.
An introduction to early modern Korean history (early 19th century to 1945) through a survey of its major intellectuals. The course gives an overview of the political and socio-economic background that gave rise to these intellectuals and then examines how they commented on and tried to shape the conditions of their times. Topics to be covered include critiques of feudal society, the origins of modern literature and historiography, socialism/communism, liberation movements, Christianity, and feminism. Readings include secondary sources, Korean texts in translation, and works by Korean intellectuals written in English.

[ASIAN 314 Europe and Its Others (also COM L 304) (IV)
Fall. 4 credits. Not offered 2001–2002.
N. Melas.
See COM L 304 for description.]

[ASIAN 347 Tantric Traditions (also RELST 349) @ # (IV)
Fall. 4 credits. Not offered 2001–2002.
D. Gold.
This course treats the development of tantric traditions in the Indian subcontinent and beyond. Philosophical, socio-religious, cultic, and visionary dimensions of tantra are discussed. We study different Hindu and Indo-Tibetan traditions, with some attention also paid to tantric developments in East Asian Buddhism.]

ASIAN 351 Indian Religious Worlds (also RELST 351) @ (IV)
Fall. 4 credits. D. Gold.
A study of religious traditions as lived today in the Indian subcontinent. Alongside some underlying similarities, attention is paid to differences in piety and practice within alternative environments: urban and rural, male and female, more and less orthodox. In addition to several Hindu traditions, Sikh, Jain, Buddhist, and Muslim traditions may also be treated. Readings include ethnologies and perhaps a novel.

[ASIAN 357 Chinese Religions (also RELST 357) @ # (IV)
Spring. 4 credits. Not offered 2001–2002.
D. Boucher.
This course presents a broad survey of Chinese religions from the earliest historic records through the late imperial and modern periods, from highbrow philisophical movements to local deity cults. Our survey focuses intensively on the great traditions of Confucianism, Taoism, and Buddhism as well as the lesser known practices that often fall through the cracks. Our goal in part is to trace patterns of continuity among competing and sometimes acrimonious voices.]

[ASIAN 358 Chinese Buddhism (also RELST 357) @ # (IV)
Fall. 4 credits. Not offered 2001–2002.
D. Boucher.
Buddhism was a mature tradition when it came to China, a society of great sophistication and antiquity, and in their remarkable

religious and cultural encounter both Buddhism and China were transformed. We consider Buddhism's introduction and acceptance, the social impact of its monastic system and moral ideals, the literary and artistic contributions of its scriptures and sculpture, the efflorescence of its doctrine and various schools, and its role in Chinese history.]

[ASIAN 359 Japanese Buddhism: Texts in Context (also RELST 359) @ # (IV)
Spring. 4 credits. Not offered 2001–2002. J M Law.
This course explores a number of major dynamics in Japanese Buddhism within the context of the larger Japanese religious ethos. We focus on the following: (1) strategies used in the introduction and spread of Buddhism in Japan, and systems of accommodation, with special attention to the *Lotus Sutra*; (2) the formulation of Buddhist doctrine and practice of four major figures in Japanese Buddhism: Saicho, Kukai, Nichiren, and Dogen; and (3) understandings of Buddhist practice expressed in the "new" religion, with Reiyukai as our case. Readings are in English, with optional readings in Japanese for graduate students.]

ASIAN 360 Confucianism @ # (IV)
Spring. 4 credits. K. Taylor.
This course surveys the major works and thinkers associated with Confucianism in China, Japan, Korea, and Vietnam. It also discusses the influence of Confucian thought upon rulers, societies, and individuals, from ancient to modern times. The focus of the course is on Confucianism as a moral philosophy of human relations. There is comparative discussion of Confucianism and other major world religions and philosophies.

ASIAN 373 Twentieth-Century Chinese Literature @ (IV)
Fall. 4 credits. E. Gunn.
A survey of the principal works in English translation, the course introduces fiction, drama, essays, and poetry of China beginning with the Republican era and continuing up to the present in the People's Republic and Taiwan, with attention to social and political issues and literary theory.

ASIAN 374 Chinese Narrative Literature (also COM L 376) @ # (IV)
Spring. 4 credits. E. Gunn.
Selected works in classical Chinese fiction are read in translation. Major novels, such as *The Dream of the Red Chamber* and *Water Margin*, are emphasized.

[ASIAN 383 Introduction to the Arts of China (also ART H 380 and ARKEO 380) @ # (IV)
Fall. 4 credits. Not offered 2001–2002. A. Pan.
See ART H 380 for description.]

[ASIAN 384 Representation and Meaning in Chinese Painting (also ART H 385) @ # (IV)
4 credits. Not offered 2001–2002. A. Pan.
See ART H 385 for description.]

ASIAN 385 History of Vietnam (also HIST 388/688) @ # (IV)
Spring. 4 credits. Also fulfills Humanities requirement. K. Taylor.
This course is a survey of Vietnamese history and culture from earliest times to the present. Graduate students may enroll and attend a seminar section.

ASIAN 390 The Sanskrit Epics @ # (IV)
Spring. 4 credits. C. Minkowski.
Readings in translation from the two Sanskrit epics, the Mahabharata and the Ramayana, supported by a study of the reception of the epics in later Indian imaginative literature. Attention is also given to comparitive theories of the epic in ancient Indo-European languages.

ASIAN 394 The House and the World: Architecture of Asia (also ART H 395) @ # (IV)
Spring. 4 credits. K. McGowan.
See ART H 395 for description.

[ASIAN 395 Classical Indian Philosophical Systems (also CLASS 395 and RELST 395) @ # (IV)
Fall. 4 credits. Prerequisite: some background in philosophy or in classical culture. Not offered 2001–2002. C. Minkowski.
A survey of the traditions of philosophical inquiry in ancient India, especially Nyaya, Sankhya, Mimamsa, and Vedanta. Topics include the origins in and relationships to the Vedas; the formation of distinct positions on such subjects as perception, language, identity, karma, and liberation; the dialogue with Buddhist, Jains, skeptics, materialist, and cynics; and new theistic models, particularly among the Saiva philosophers in Kashmir.]

ASIAN 396 Southeast Asian History from the Eighteenth Century (also HIST 396) @ (III)
Spring. 4 credits. T. Loos.
See HIST 396 for description.

[ASIAN 400 Tibetan Buddhism (also RELST 400) @ # (IV)
Fall. 3 credits. Prerequisites: at least 1 course on Buddhism or Asian religions, or the permission of the instructor. Class size is limited to 15. Not offered 2001–2002. J M Law.
This course is an exploration of the development of the Vajrayana tradition through a focus on the myths and stories about, and writings by central figures in, what is known in the west as Tibetan Buddhism. Following an overview of the historical development of this tradition, we explore the contributions made by several (mythico-historical) seminal thinkers in the tradition including Atisa, Naropa, Marpa, Milarepa, and Tsongkapa, and explore how their life works reflect the process of adapting Buddhism to the Tibetan context. (We also include myths and stories about the mythical founder Padmasambhava.) Readings include primary source religious works written by or attributed to these figures, hagiographical accounts of their lives (their "biographies" and "autobiographies" and tributes to them by their disciples), and treatises and commentaries on their works which are influential in the formulation of the various schools of Tibetan Buddhism. In the final segment of the course, we explore the implications of exile for Tibetan Buddhism, and read several popular works by the Ven. Tenzin Gyatso (the fourteenth Dalai Lama), to show the dramatic changes made in the tradition as it reformulates itself in a more global context. Throughout this course, we direct our attention to dynamics of tradition formulation, articulation, and reformation as it changes throughout Tibetan history. In addition to two short writing assignments and a final research project, we take field trips to two regional Tibetan monasteries.]

[ASIAN 405 Global Tokyo (also S HUM 404) (III)
Fall. 4 credits. Not offered 2001–2002. T. Bestor.
See S HUM 404 for description.]

[ASIAN 407 Religion and Human Rights (also RELST 407) (IV)
Spring. 3 credits. Prerequisite: permission of instructor. Limited to 15 students. Not offered 2001–2002. J. M. Law.
This course, open to advanced students with a strong background in either religious studies, human rights work, or international law pertaining to human rights, is an exploration of the various ways that the sub-disciplines within religious studies (hermeneutics, critical ideological studies, the sociology of religion, etc.) can shed light on our understanding of human rights issues. In particular, the course focuses on four intersections of religion and human rights: religious traditions as ideologies of oppression used to legitimate major human rights violations; religious tradition identification as the primary "subject relationships" causing certain people or groups to be targeted for persecution; religious traditions and doctrine as the motivation for certain human rights workers to campaign as advocates for victims; and the role of religious discourse in attempts at reconciliation after major human rights violations have occurred. Through specific cases (mostly Asian), students explore the methodological issues that each of these intersections raises. The focus of the course is on close readings of primary source documents (some in translation by necessity), context studies of historical and social events surrounding major violations of human rights, and preparation of public response papers for each of the cases studied. In addition to weekly writing assignments prepared as part of a portfolio of written work, students also prepare one group presentation for the class. This course is offered in conjunction with the Writing in the Majors Program.]

[ASIAN 410 Chinese Performing Arts @ (IV)
Fall. 4 credits. Not offered 2001–2002. E. Gunn.
The course surveys drama, music theater, and film in twentieth-century China. Some material requires knowledge of Chinese.]

[ASIAN 411 History of the Japanese Language (also LING 411) @ # (III)
Fall. 4 credits. Not offered 2001–2002. J. Whitman.
See LING 411 for description.]

[ASIAN 412 Linguistic Structure of Japanese (also LING 404) (III)
Spring. 4 credits. Not offered 2001–2002. J. Whitman.
See LING 404 for description.]

ASIAN 415 Virtual Orientalisms (also S HUM 415 and COM L 418) # (IV)
Spring. 4 credits. Enrollment limited to 25 students. Not offered 2001–2002. B. de Bary.
A comparative study of representations of Japan in postwar French, American, and Japanese cultures. The course is particularly concerned with the role of virtual technologies in representations of Japan, as well as with a proliferation of late twentieth-century representations of Japan as a site of utopic or dystopic virtuality. Positing Orientalism as a broadly-based, but definitely not monolithic, ensemble of representational and regulatory

practices, we attend to differences in the historical context. Examples include: Roland Barthes' figuring of Japan as a "possibility of difference," or of "the very fissure of the symbolic" in post-1968 France, and Michael Crichton's more recent superimposition of a "Rising Sun" over processes of American racial hybridization, high-tech reproduction and alteration of images, and trade imbalances. Ambiguously represented as a culture of both the "chrysanthemum" (the hyper-aesthetic) and the "sword" (the hyper-phallic), with the advent of what some have called "techno-orientalism," Japan has increasingly become a preoccupation of technological and futurological imagination. We consider literary, filmic, and theoretical texts, as well as science fiction, video games, and fanzines.

ASIAN 416 Undergraduate Seminar on Gender and Sexuality in Southeast Asian History (also HIST 416) (III)
Fall. 4 credits. T. Loos.
See HIST 416 for description.

[ASIAN 417 Second Language Acquisition (also LING 415) (III)
Spring. 4 credits. Not offered 2001–2002. Y. Shirai.
See LING 415 for description.]

[ASIAN 427 Buddhist Monasticism (also RELST 425) @ # (IV)
Fall. 4 credits. Not offered 2001–2002. D. Boucher.
Buddhist monasticism has existed and continues to exist in the context of a complex exchange system within Buddhist cultures. The laity provide for the monks' and nuns' material needs; the mendicants, by accepting these offerings, provide an opportunity for spiritual merit and advancement for the faithful. This course explores Buddhist renunciant traditions—sedentary monks and nuns, forest hermits, revolutionary reformers, and others—in the light of this "religious capitalism." We consider the formation of this role for monks in Buddhist societies as well as attempts both to defend and to critique this exchange system within Buddhism. This course operates in a seminar format, which assumes careful reading, active participation, and independent research on the part of all students.]

ASIAN 428 Democracy and the City: East and West, Old and New (S HUM 402)
Fall. 4 credits. Limited to 15 students. Permission of instructor. F. Jullien.
See S HUM 402 for description.

[ASIAN 429 Structure of the Chinese Language (also LING 429) @ (III)
Fall. 4 credits. Not offered 2001–2002. H. Tao.
See LING 429 for description.]

[ASIAN 430 Structure of Korean (also LING 430) (III)
Spring. 4 credits. Not offered 2001–2002. J. Whitman.
See LING 430 for description.]

ASIAN 431 Language, Religion, and Politics in Modern South Asia (IV)
Fall. 4 credits. F. Mir.
This course examines the modern formation of linguistic identities in South Asia with an emphasis on their role in religious nationalisms and movements for regional autonomy. Drawing on theoretical literature about language and identity to provide a framework, we explore particular movements in South Asian history when linguistic identity became politically charged. Specific topics include: the role of Hindi, Urdu, and Punjabi in constituting, respectively, Hindu, Muslim, and Sikh nationalism in the colonial period; the relationship between linguistic identity and regional movements in post-colonial South Asia, looking specifically at Assamese and Tamil; the adoption of Urdu as the national language of Pakistan; and how regional identities and languages, particularly Bengali until the civil war of 1971, were subsumed under the rubric of Muslim unity.

ASIAN 432 Perspectives from Historiography, Literature, and Film (IV)
Spring. 4 credits. F. Mir.
The aim of the course is to familiarize students with the main historical arguments regarding India's partition, and to compare the narratives of partition as they emerge from different genres. The course looks at the primary historiographical arguments about the partition of British India and its immediate impact. It explores fictional narratives of partition events, looking primarily at short stories and excerpts from novels. Finally, it examines how the narrative of partition has been represented in Indian and Pakistani cinema. Students are encouraged to think about different forms of historical narrative and how historiography can incorporate multiple perspectives and interpretations into the understanding of a historical event by drawing on alternative sources.

[ASIAN 441 Mahayana Buddhism (also RELST 441) @ # (IV)
Spring. 4 credits. Not offered 2001–2002. D. Boucher.
By reading successive examples of Mahayana Buddhist literature, we study the formation and evolution of the ideal of the bodhisattva; the understanding of transcendental wisdom and the concept of emptiness; and the workings of both the conscious and subconscious mind in the course of spiritual practice. We include discussion of major philosophical schools, as well as issues of social setting and popular religious practice, in both India and East Asia.]

ASIAN 449 History and Methods of the Academic Study of Religion (also RELST 449) (III)
Spring. 4 credits. Prerequisite: 1 course satisfying the religious studies major. D. Gold.
In this course we read and discuss formative works in the study of religion, exemplary modern studies, and commentaries on contemporary issues in the field. We first explore the rise of the analytic study of religion in the nineteenth century, contrasting the implications of romantic and enlightment temperaments for academic method. We then examine some different disciplinary perspectives on religion developed in the twentieth century, with attention to exemplary writers. We conclude with some postmodern and postcolonial perspectives. In addition to the theoretical perspectives presented in the works read, we also pay attention to the ways in which they engage readers' imaginations and what they suggest about the characteristics of knowledge in Religious Studies.

ASIAN 450 Crime and Diaspora in Southeast Asian History (also HIST 451) @ # (III)
Fall. 4 credits. E. Tagliacozzo.
See HIST 451 for description.

ASIAN 460 Indian Meditation Texts (also RELST 460) @ # (IV)
Fall. 4 credits. D. Gold.
Because texts that record visionary experience prescribe the practice of contemplation, and present enigmatic utterances are highly valued in Indian tradition, they need to be taken seriously by students of Indian and world civilizations. Yet the special problems of interpretation that they present have often caused meditation texts to be passed over in embarrassed, sometimes reverent silence. In this course we draw on approaches from literary criticism, anthropology, and religious studies to explore a number of the problems to which these texts give rise: in what ways are the apparent differences in experience presented in meditation texts shaped by different cosmologies and ritual practice? Do different literary genres have particular religious implications? What are the relations between convention and experience in the creation of the texts? Readings are drawn from the Upanishads and Tantra, devotional verse in the vernaculars, and the classical meditation manuals of Hinduism and Buddhism. Some attention may be given to Indian Sufi materials. No knowledge of Indian languages is required.

[ASIAN 463 Readings in Hindi and Urdu Literature @ (IV)
Spring. 4 credits. Not offered 2001–2002. D. Gold.
Selected topics in Hindi and Urdu literature, with readings in the original; discussions in Hindi-Urdu and English. May be repeated for additional credit with consent of instructor.]

[ASIAN 471 Japanese Theatre (also THETR 471) @ # (IV)
Fall. 4 credits. Alternates with ASIAN 470. Not offered 2001–2002. K. Brazell.
A study of traditional forms of Japanese theatre. Topics include ritual and theatre, noh and kyogen, kabuki, and the puppet theatres, and contemporary theatrical use of the traditional forms. Special emphasis is placed on dramaturgy, acting styles, performance aesthetics, and theories of performer training.]

[ASIAN 476 Senior Seminar: Comparative Colonial Law and Society (also HIST 476 and WOMNS 476) @ (III)
Fall. 4 credits. Letter grade only. Limited to 15 students. Not offered 2001–2002. T. Loos.
See HIST 476 for description.]

[ASIAN 479 Art of the T'ang Dynasty (also ART H 481) # @ (IV)
Spring. 4 credits. Not offered 2001–2002. A. Pan.
See ART H 481 for description.]

[ASIAN 481 Translation and Identities @ (IV)
Spring. 4 credits. Not offered 2001–2002. N. Sakai.
Translation establishes a division of two spheres and thereby marks the limit of what can be expressed in one medium. Broadly understood, translation can take place not only between two national languages but also at a variety of boundaries within a putatively single society. The seminar investigates

different economies of translation by which different social and cultural identities are constructed, emphasizing the disappearance of multi-lingualism in modern nation-state and the mutation of translation economies which gave rise to new ways of imagining the organicist unity of the society in eighteenth-century and twentieth-century Japan. Seminar readings are translations of pre-modern Japanese and Chinese writings, and modern European and Japanese philosophical articles (in English).]

[ASIAN 482 Seminar: Gender Adjudicated (also HIST 480) # (III)
Fall. 4 credits. Not offered 2001–2002. T. Loos.
See HIST 480 for description.]

ASIAN 483 Internationalism, Nationalism, and Modern Japanese Discursive Space @ (III)
Spring. 3 credits. N. Sakai.
The late nineteenth century marks an important transitional period; nation-states formed in Britain, France, Japan, Germany, the United States, and elsewhere sought to become imperial powers; and "internationalism" virtually collapsed. Focusing on Japanese examples, but not excluding other cases, we study the discursive spaces of modern national subjectivity with a view to the problems of ethnicity, colonialism, imperial sexism, violence, historical memory, post-coloniality and academic knowledge. A major critical paper is required.

ASIAN 486 Ritual and Performance in Japanese Religions (also REL ST 486) (IV)
Spring. 4 credits. Class size limited to 12. Prerequisites: instructor consent for undergraduates. Ability to read Japanese is not required, but there are optional readings in Japanese. Graduate students may sign up for this as a graduate level course. J M Law.
In the last fifty years in Japan, there has been a proliferation of revived, restored, invented and newly created folk performing arts throughout the country. This course is an exploration of this phenomenon, and its relationship to Japanese religion. The course begins with an overview of the major theoretical works relating to tradition creation, revitalization and invention, with a focus on ritual performance theory. With this theoretical basis, we explore several paradigmatic cases classified as "folk performing arts" (minzoku geinô) which are directly related to overtly religious concerns. Through these cases, we see how both national and local identity discourses are being worked out through public ritual performances. Each student also has an opportunity to conduct in-depth research on one ritual performance tradition, or a given aspect of critical theory relating to ritual studies. This course is recommended for upper level undergraduates with the consent of the instructor or graduate students.

ASIAN 490 Tales of the Heike (also HIST 490) @ # (III)
Fall. 4 credits. J. R. Piggott.
See HIST 490 for description.

[ASIAN 491 Art and Collecting: East and West (also ART H 490) @ # (IV)
Spring. 4 credits. Not offered 2001–2002. K. McGowan.
See ART H 490 for description.]

ASIAN 493 Problems in Modern Chinese History (also HIST 493) @ (III)
Fall. 4 credits. S. Cochran.
See HIST 493 for description.

ASIAN 496 Tokugawa Literature and Thought @ # (IV)
Spring. 4 credits. N. Sakai.
An introduction (in English translation) to literary, theatrical, and intellectual works of the Tokugawa period (1600–1868). We examine the characteristics of early Tokugawa literary and theatrical works and see how different they are from the literary works of the later Tokugawa period. We also read the philosophical and philological works on the classics by writers such as Ogyu Sorai and Motoori Norinaga to understand the ways contemporary Japanese intellectuals understood cultural activities and literature during the Tokugawa period.

ASIAN 499 Problems in Modern Chinese History (also HIST 499) @ (III)
Spring. 4 credits. S. Cochran.
See HIST 499 for description.

ASIAN 580 Problems in Asian Art: Water and Politics in Southeast Asia (also ART H 580)
Spring. 4 credits. K. McGowan.
See ART H 580 for description.

ASIAN 597 Japan Before 1600 (also HIST 597)
Fall. 4 credits. J. Piggott.
See HIST 597 for description.

Asia—Graduate Seminars

For complete descriptions of courses numbered 600 or above, consult the director of graduate studies.

[ASIAN 601 Southeast Asia Seminar: Indonesia (also GOVT 652)
Fall. 3–4 credits. Not offered 2001–2002. J. Siegel.
The course serves as an introduction to Indonesia, considered in several dimensions: nationalist Indonesia, ethnic Indonesia, the recent history of nationalism and the politics of the present, minority problems, etc. No knowledge of Indonesian is required.]

ASIAN 602 Southeast Asia Seminar
Fall or spring. 4 credits. Staff.

ASIAN 603 Southeast Asia Topical Seminar: Sociology of Natural Resources and Development (also R SOC 607)
Spring. 3 credits. P. Gellert.
Building on theories in the sociology of development, this seminar examines the role of natural resource extraction, processing, and exports to global markets in the development trajectories of nations in Asia, Africa, and Latin America. This course engages students in both theoretical debates and practical implications of resource access, control, and conflict amongst various social stakeholders. Detailed historical cases are examined, primarily from Southeast Asia (Indonesia, Malaysia, Philippines).

[ASIAN 604 Southeast Asia Topical Seminar
Spring. 3–4 credits. Not offered 2001–2002. Staff.]

ASIAN 605–606 Master of Arts Seminar in Asian Studies
605, fall; 606, spring. 2–4 credits. Staff.

[ASIAN 609 Modern Japanese Studies: The Formation of the Field in History and Literature (also HIST 609)
Spring. 4 credits. Not offered 2001–2002. N. Sakai, J. V. Koschmann, B. de Bary.
See HIST 609 for description.]

[ASIAN 610 SLA and the Asian Languages (also LING 609)
Fall. 4 credits. Not offered 2001–2002. Y. Shirai.
See LING 609 for description.]

ASIAN 612 Japanese Bibliography and Methodology
Fall. 1 credit. Prerequisite: permission of instructor. Required of honors students and M.A. candidates. F. Kotas.

ASIAN 613 Southeast Asian Bibliography and Methodology
Fall. 1 credit. Prerequisite: permission of instructor. A. Riedy.
This course is designed to instruct students in methods of identifying and locating resources for the study of Southeast Asia. Emphasis is on the practical aspects of using various types of bibliographical tools to identify both primary and secondary sources in Southeast Asian and Western languages. Electronic databases and online services as well as traditional printed resources are covered. Relevant arcana of library science is explained as necessary. Required of honors students and Master of Arts candidates. No foreign language competence is required but a reading knowledge of at least one Southeast Asian language or other Asian language (especially Chinese or Japanese) and a major European language (especially French, Spanish, or Dutch) is highly desirable.

[ASIAN 623–624 Topics in South Asia
623, fall; 624, spring. 1 credit. Not offered 2001–2002. Staff.
A series designed to introduce as well as enhance and build on students' knowledge of various topics of importance to South Asia (Bangladesh, India, Nepal, Pakistan, and Sri Lanka). Weekly lectures survey contemporary themes in South Asian scholarship where visiting scholars and members of the Cornell community discuss a multidisciplinary range of issues. These may include science and nation building; ritual power and resistance; tribal communities and the environment; industrial and agrarian relations; gender and the media; and economic liberalization. A short essay is required at the end of the course.]

ASIAN 648 Peddlers, Pirates, and Prostitutes: Subaltern Histories of Southeast Asia, 1800–1900 (also HIST 249/648)
Spring. 4 credits. E. Tagliacozzo.
See HIST 648 for description.

ASIAN 651 Crime and Diaspora in Southeast Asian History (also HIST 451/650)
Fall. 4 credits. E. Tagliacozzo.
See HIST 650 for description.

ASIAN 684 Southeast Asia in the World System: Capitalism and Incorporation, 1500-Present (also HIST 284/684)
Fall. 4 credits. E. Tagliacozzo.
See HIST 684 for description.

ASIAN 685 History of Vietnam (also HIST 388/688)
Spring. 4 credits. K. Taylor.

This course is a survey of Vietnamese history and culture from earliest times to the present. Graduate students may enroll and attend a seminar section.

ASIAN 690 Tales of the Heike (also HIST 490/690)
Fall. 4 credits. J. R. Piggott.

ASIAN 693 Problems in Modern Chinese History (also HIST 693)
Fall. 4 credits. S. Cochran.
See HIST 693 for description.

ASIAN 694 Problems in Modern Chinese History (also HIST 694)
Spring. 4 credits. S. Cochran.
See HIST 694 for description.

ASIAN 696 Modern Southeast Asia: Graduate Proseminar (also HIST 396)
Spring. 4 credits. T. Loos.
See HIST 696 for description.

ASIAN 701–702 Seminar in East Asian Literature
701, fall; 702, spring. 1–4 credits. Staff.

ASIAN 703–704 Directed Research
703, fall or spring; 704, fall or spring. 1–4 credits. Staff.

ASIAN 899 Master's Thesis Research
Fall, spring. 2–4 credits. Staff.

ASIAN 999 Doctoral Dissertation Research
Fall, spring. 2–4 credits. Staff.

Honors Courses

ASIAN 401 Asian Studies Honors Course
Fall or spring. 4 credits. Intended for seniors who have been admitted to the honors program. Staff.
Supervised reading and research on the problem selected for honors work.

ASIAN 402 Asian Studies Honors: Senior Essay
Fall or spring. 4 credits. Prerequisite: admission to the honors program. Staff.
The student, under faculty direction, prepares an honors essay.

ASIAN 403–404 Asian Studies Supervised Reading
Fall, spring, or both. 1–4 credits. Prerequisite: permission of instructor. Open to majors and other qualified students. Intensive reading under the direction of a member of the staff.

Bengali

BENGL 121–122 Elementary Bengali
121, fall; 122, spring. 4 credits each term. *BENGL 122 provides language qualification.* Prerequisite: for BENGL 122, BENGL 121 or examination. Staff.
The emphasis is on basic grammar, speaking, and comprehension skills; Bengali script is also introduced.

BENGL 201–202 Intermediate Bengali Reading
201, fall; 202, spring. 3 credits each term. *BENGL 202@ provides language proficiency.* Prerequisites: for BENGL 201, BENGL 122 or examination; for BENGL 202, BENGL 201 or examination. Staff.
Continuing instruction in grammar with attention to speaking and reading skills.

BENGL 203–204 Intermediate Bengali Composition and Conversation
203, fall; 204, spring. 3 credits each term. *BENGL 204@ provides language proficiency.* Prerequisites: for BENGL 203, BENGL 122 or examination; for BENGL 204, BENGL 203 or examination. Staff.
Continuing instruction in grammar with attention to writing skills.

BENGL 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. Staff.
Taught on a specialized basis to address particular student needs. Times will be arranged with instructor.

BENGL 303–304 Bengali Literature I, II
303, fall; 304, spring. 4 credits each term. Prerequisites: BENGL 203–204 or equivalent. Staff.
An introduction to noted Bengali writers. Selections of works by Rabindranath Tagore and Abanindranath Tagore and short stories by Bonophul are covered. The course is devoted to reading these works and developing literary criticism and creative writing in Bengali.

Burmese

NOTE: Contact S. Tun in Morrill Hall 405 before classes begin for placement or other testing and organizational information.

BURM 103–104 Burmese Conversation Practice
103, fall; 104, spring. 2 credits each term. Prerequisites: for BURM 104, BURM 103 and BURM 121. May not be taken alone. Must be taken simultaneously with BURM 121–122. Satisfactory completion of BURM 104/122 fulfills the qualification portion of the language requirement. S. Tun.
Additional drills, practice, and extension of materials covered in BURM 121 and 122. These courses are designed to be attended simultaneously with BURM 121–122 respectively, allowing students to obtain qualification within a year.

BURM 121–122 Elementary Burmese
121, fall; 122, spring. 4 credits each term. *BURM 122 provides language qualification.* Prerequisite: for BURM 122, BURM 121. May be taken alone or simultaneously with BURM 103–104. Satisfactory completion of BURM 104/122 fulfills the qualification portion of the language requirement. S. Tun.
A thorough grounding is given in all language skills: listening, speaking, reading, and writing.

BURM 123 Continuing Burmese
Fall. 4 credits. *Provides language qualification.* Prerequisite: BURM 122. Satisfactory completion of BURM 123 fulfills the qualification portion of the language requirement. S. Tun.
Continuing instruction in conversational and reading skills, to prepare students for 200-level courses.

BURM 201–202 Intermediate Burmese Reading @
201, fall or spring; 202, fall or spring. 3 credits each term. *BURM 201 provides language proficiency.* Prerequisites: for BURM 201, BURM 123; for BURM 202, BURM 201. S. Tun.
Continuing instruction in Burmese, with emphasis on consolidating and extending conversational skills, and on extending reading ability.

BURM 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. S. Tun.
Taught on a specialized basis to address particular student needs. Times will be arranged with instructor.

BURM 301–302 Advanced Burmese
301, fall or spring; 302, fall or spring. 3 credits each term. Prerequisites: for BURM 301, BURM 202 or permission of instructor; for BURM 302, BURM 301. S. Tun.
Continuing instruction on conversational and literary skills, but with special emphasis on reading. Students encounter various genres and styles of written Burmese. Readings will include articles on current events, and either several short stories or a novel. Focus is on developing reading skills, particularly on vocabulary development, consolidating and expanding grammar, and appreciating stylistic and cultural differences.

BURM 303–304 Advanced Burmese II
303, fall or spring; 304, fall or spring. 3 credits each term. Prerequisite: for BURM 303, BURM 202 or permission of instructor; for BURM 304, BURM 303. S. Tun.
This is a course for students who have good conversational ability in Burmese and some familiarity with Burmese culture, but who need to strengthen reading skills and further enrich their vocabulary. Students in consultation with the instructor, are able to select reading materials. There is also an opportunity for those who need it, to strengthen listening skills, through the study of current films, TV, and radio programs in Burmese.

BURM 401–402 Directed Individual Study
401, fall; 402, spring. 2–4 credits variable each term. Prerequisite: permission of instructor. S. Tun.
This course is designed to accommodate the needs of advanced or specialized students, and faculty interests. Topics of reading and discussion are selected on the basis of student need.

Cambodian

See Khmer.

Chinese

NOTE: Testing for placement, except for those with near-native abilities (particularly those schooled in a Chinese setting up until the age of about 12) takes place in registration week, before classes begin. Time and place will be posted on the web at www.arts.cornell.edu/asian/index.html under "Language Programs" and the bulletin board outside Rockefeller 388. Students with some Chinese schooling who want to obtain 3 or 6 credits for their proficiency will be tested at the beginning of the second week of classes. Again, the time and place will be announced.

CHIN 101–102 Elementary Standard Chinese ('Mandarin')
101, fall; 102, spring. 6 credits each term. Prerequisite: for CHIN 102, CHIN 101, or equivalent. You must enroll in lecture and 1 section. Since each section is limited to 10–12 students, students missing the first 2 class meetings without a university excuse are dropped so others may register. No student will be added after the second week of classes. Satisfactory completion of CHIN 102 fulfills the qualification portion of the language requirement. Staff.
A course for beginners or those who have been placed in the course by examination. The course gives a thorough grounding in conversational and reading skills. Students with some facility in the spoken language (because Chinese is spoken at home) but who do not read characters should take 109–110. Students who read Chinese, but who speak 'dialects,' such as Cantonese or Amoy, should consult with the staff before enrolling.

CHIN 109–110 Beginning Reading and Writing (Standard Chinese)
109, fall; 110, spring. 4 credits each term. *CHIN 110 provides language qualification.* Prerequisites: must have permission of instructor to enroll. Students who complete CHIN 110 normally continue with CHIN 209 and 210. Because of high demand for this course, students missing the first 2 meetings without a university excuse are dropped so others may register. Satisfactory completion of CHIN 110 fulfills the qualification portion of the language requirement. F. Lee Mehta.
This course is intended primarily for students who speak some Chinese (e.g., at home), but who have had little or no formal training. The focus is on characters, reading comprehension, basic composition, standard grammar, and reading aloud with standard Chinese ('Mandarin') pronunciation.

CHIN 111–112 Elementary Cantonese
111, fall; 112, spring. 4 credits each term. Prerequisite: for CHIN 112, CHIN 111 or equivalent. CHIN 111–112 only satisfies the qualification portion of the language requirement if the student can also demonstrate a comparable reading ability. H. Huang.
A course in conversational standard Cantonese (as spoken in Hong Kong and Canton) for beginners. Students need not have a Mandarin background to take this course, but those with elementary reading skills are also introduced to Cantonese (character) writing.

CHIN 113–114 Beginning Reading for Cantonese Speakers
113, fall; 114, spring. 3 credits each term. *CHIN 114 provides language qualification.* Prerequisite: everyday conversational ability in Cantonese. H. Huang.
This course is intended primarily for students who speak some Cantonese (e.g., at home), but who have had little or no formal training in writing. The focus is on characters, reading comprehension, standard grammar, and reading aloud with Cantonese pronunciation.

CHIN 201–202 Intermediate Standard Chinese ('Mandarin') @
201, fall or summer; 202, spring or summer. 4 credits each term. *CHIN 201 provides language proficiency.* Prerequisites: for CHIN 201, CHIN 102 with a grade of C+ or above or equivalent; for CHIN 202, CHIN 201 or equivalent. Section 1, Q. Teng; Section 2, Staff.
Continuing instruction in written and spoken Chinese with particular emphasis on consolidating basic conversational skills and improving reading confidence and ability.

CHIN 209–210 Intermediate Reading and Writing @
209, fall; 210, spring. 4 credits each term. *CHIN 209 provides language proficiency.* Prerequisites: for CHIN 209, CHIN 110 or equivalent; CHIN 210, CHIN 209. After completing 210, students may only take 400-level courses in Chinese. X. Sun.
Continuing focus on reading and writing for students with spoken background in standard Chinese; introduction of personal letter writing and other types of composition.

CHIN 211–212 Intermediate Cantonese @
211, fall; 212, spring. 4 credits each term. *CHIN 211 provides language proficiency.* H. Huang.
Continuing instruction in spoken Cantonese and in characters (Cantonese and Mandarin), reading comprehension, and reading aloud with Cantonese pronunciation.

CHIN 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. Staff.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

CHIN 301–302 High Intermediate Chinese
301, fall; 302, spring. 4 credits each term. Prerequisites: for CHIN 301, CHIN 202 or equivalent; for CHIN 302, CHIN 301. F. Lee-Mehta.
Continuing instruction in spoken Chinese and in various genres and styles of written Chinese.

CHIN 411–412 Advanced Chinese: Fiction, Reportage, Current Events
411, fall; 412, spring. 4 credits each term. Prerequisites: for CHIN 411, CHIN 302 or equivalent; for CHIN 412, CHIN 411 and permission of instructor required. Q. Teng.
Reading, discussion, and composition at advanced levels.

CHIN 425 Special Topics
Fall or spring, according to demand. 4 credits. Prerequisite: permission of instructor. Staff.
A number of different topics in advanced Chinese language, advertised the previous semester, are offered under this title to accommodate the needs of advanced or specialized students, and take advantage of faculty interests. Topics include: correspondence and composition, excerpts from classical novels, Ch'ing documents, xiesheng comedy routines, etc. May be repeated for credit.

Chinese FALCON (Full-year Asian Language CONcentration)

For full information, brochures, etc., see the FALCON secretary 125 Rockefeller Hall
e-mail: falcon@cornell.edu or
www.arts.cornell.edu/asian/falcon.htm.

CHIN 160 Introductory Intensive Mandarin
Summer only. 8 credits. *Provides language qualification.* Completion of 160 fulfills the qualification portion of the language requirement. S. Hoare and staff.
Introduction to spoken and written Mandarin. Lectures on linguistic and cultural matters, intensive practice with native speakers, and laboratory work. Students who complete this course with a grade of at least B are normally eligible to enroll in CHIN 201.

CHIN 161–162 Intensive Mandarin @
161, fall; 162, spring. 16 credits each term. *Provides language proficiency.* Prerequisites: for CHIN 161, CHIN 160 or equivalent or permission of instructor; for CHIN 162, CHIN 161 or placement by FALCON staff prior to beginning of spring term. Students must apply formally to the program; application open to all Cornell students and students from other institutions. S. Hoare and staff.
Work on spoken and written Chinese from an intermediate level to an advanced level. This is a full-time program and full academic load; the demands of the program do not normally permit students to take other courses simultaneously. With a sequence of 160, 161, and 162, in only one calendar year a student can complete as much Chinese as would be contained in three or more years of regular study at most academic institutions. This course sequence also serves to fulfill the language requirement for the MA in Asian Studies and the joint MBA/MA in Asian Studies.

Literature in Chinese

CHLIT 213–214 Introduction to Classical Chinese @ #
213, fall; 214, spring. 3 credits each term. *Provides language proficiency.* Prerequisite: qualification in Chinese or permission of instructor. May be taken concurrently with CHIN 101–102, 201–202, 301–302. R. McNeal, D. X. Warner.
This course is an introduction to the fundamental grammar and vocabulary of classical Chinese. Students analyze and translate short passages in class, and are tested on these skills in regular quizzes and examinations. Students should be competent in usage of the Chinese script and have at least the equivalent of two years of any East Asian language that employs the Chinese writing system (e.g., Mandarin, Cantonese, Japanese).

CHLIT 300 Reading from the Early Masters @ #
Spring. 4 credits. Prerequisites: CHLIT 213–214 or permission of instructor. R. McNeal.
Students read and discuss several passages from early classical texts, including the Confucian Analects, the Mozi, the Guanzi, and others. Attention is paid to grammar, historical context, and methodology. Students who have not completed one year of classical Chinese at Cornell need permission from the instructor to register.

CHLIT 307 Readings in Classical Chinese Literature @
Fall. 4 credits. Prerequisite: CHLIT 214 or permission of instructor. D. Warner.
This is an introduction to classical Chinese literary texts. Students survey a selection of master works from the Pre-Qin and Han dynasty periods, covering the major genres, themes and literary styles that were foundational to later Chinese literary tradition.

CHLIT 421–422 Directed Study
Fall or spring. 2–4 credits each term. Prerequisite: permission of instructor. Staff.
Students choose a faculty member to oversee this independent study. The student and the faculty member work together to develop course content.

CHLIT 423 Readings in Chinese History @
Fall. 4 credits. Staff.
This course is designed for seniors and graduate students who are interested in ethnic relations and minority issues in Chinese history, and who wish to pursue further research in this field in the future. By studying the selected readings from Chinese historical documents (which were written in classical Chinese), students familiarize themselves with the vocabulary and categorization of the documents, obtain the basic skills needed for reading and analyzing Chinese historical materials, and learn to use original Chinese source materials in conducting their own research. The aim is to provide insight into the historical relations between the Han Chinese and ethnic minorities in China.

CHLIT 435 Chinese Buddhist Texts @ # IV
Spring. 4 credits. Prerequisite: 1 year of literary Chinese or permission of the instructor. Not offered 2001–2002. D. Boucher.
This seminar is designed to introduce students to the idiom of Buddhist Chinese. We start by reading selections from the early translations to gain a grounding in the vocabulary and syntax that came to characterize literary Buddhism in China. From there we survey some of the so-called apocryphal texts (Buddhist "sutras" produced in China) and look at samples from important writers and schools, depending on student interests. This course is open to students in any area of East Asia with an interest in developing skills in Buddhist texts.

[CHLIT 610 Chinese Cultural Criticism
Fall. 4 credits. Not offered 2001–2002. E. Gunn.
This course develops questions about cultural criticism of China through reading and discussion of modern critiques of Chinese culture, primarily from the late Qing to the post-Mao era, selected from the work of both Chinese and Western critics. Particular emphasis is placed on the role of cultural criticism in producing literature.]

CHLIT 615 Seminar: Ideas and Literature of Medieval China
Spring. 4 credits. D. Warner.
This is a graduate-level seminar that offers study of the language and genres of Medieval Chinese literature in the context of Medieval Chinese intellectual history. Students read from a range of primary works—including poetry, prose, literary treatises, philosophical essays, and historical writings—from the Later Han to the Sui and early Tang, in addition to a selection of modern scholarly essays in the field. Our primary aim is to re-examine the interrelationship between the history of ideas and the formation of a medieval poetics during this period of Chinese literary history.

CHLIT 618 Seminar on Ancient China
Fall. 4 credits. Also fulfills Humanities requirement. Prerequisite: CHLIT 213–214 or permission of instructor. R. McNeal.
This seminar provides graduate students and advanced undergraduates with a critical introduction to the most important sources, both textual and archaeological, for the study of ancient China. We cover materials from the earliest historical period, circa 1300 B.C., down to the consolidation of empire in the first century B.C. Outstanding problems and controversies pertaining to this period are covered, and basic methodological tools presently used by historians, textual critics, paleographers, and archaeologists are addressed. Students participate in the seminar by taking responsibility for presenting on certain topics in detail, some of which may include topics related to their own research or interests.

CHLIT 621–622 Advanced Directed Reading: Chinese Historical Syntax
621, fall; 622, spring. 2–4 credits. Prerequisite: permission of instructor. Staff.
Students choose a faculty member to oversee this independent study. The student and the faculty member work together to develop class readings.

Hindi

HINDI 101–102 Elementary Hindi-Urdu
101, fall; 102, spring. 6 credits each term. *HINDI 102 provides language qualification.* Prerequisite: for HINDI 102, HINDI 101 or equivalent. M. Farooqi.
A semi-intensive course for students without prior experience in Hindi-Urdu or a closely related language. A thorough grounding is given in all language skills: listening, speaking, reading, and writing. Students who have had exposure to Hindi-Urdu or a closely related language in the home or otherwise should generally take HINDI 109–110. Check with instructor regarding placement.

HINDI 109–110 Accelerated Elementary Hindi-Urdu
109, fall; 110, spring. 3 credits each term. *HINDI 110 provides language qualification.* Prerequisite for HINDI 110: HINDI 109 or equivalent. M. Farooqi.
An entry-level sequence for students with some prior exposure to Hindi-Urdu or a closely related language. This course sequence provides a thorough grounding in all the language skills: listening, speaking, reading, and writing. Completion of this sequence, including satisfactory performance on an examination given at the end of HINDI 110, constitutes a level of performance equal to that of the 101–102 sequence, and is thus considered to fulfill qualification for the language requirement plus eligibility for 200-level Hindi-Urdu courses. Check with instructor regarding placement.

HINDI 201–202 Intermediate Hindi Reading @
201, fall; 202, spring. 3 credits each term. *HINDI 201 provides language proficiency.* Prerequisites: for HINDI 201, HINDI 102; for HINDI 202, HINDI 201 or permission of instructor. M. Farooqi.

HINDI 203–204 Intermediate Composition and Conversation @
203, fall; 204, spring. 3 credits each term. *HINDI 203 provides language proficiency.* Prerequisites: for HINDI 203, HINDI 102; for HINDI 204, HINDI 203 or permission of instructor. M. Farooqi.
Throughout this course sequence all aspects of language learning are practiced: listening, speaking, reading, and writing. In 203, video materials are used and the emphasis is on the conversational aspect of the language. In 204, the focus shifts to reading skills and the main text used is a popular novel.

HINDI 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. M. Farooqi.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

HINDI 301–302 Advanced Readings in Hindi Literature
301, fall; 302, spring. 4 credits each term. Prerequisites: for HINDI 301, HINDI 202; for HINDI 302, HINDI 301 or equivalent. M. Farooqi.
Selected readings in modern Hindi literature.

Indonesian

For students who have completed INDO 121–122–123 or its equivalent there is the option of a one-semester program in Malang, East Java, during the junior year. The program combines a variety of cultural and artistic options with area course work and advanced language study. Complete information is available through Cornell Abroad.

Students who have completed a minimum of 18 credits or the equivalent are eligible to apply for a summer program in the Advanced Indonesian Abroad Program. Further information is available from Professor John Wolff (217 Morrill Hall, 255–0733).

INDO 121–122 Elementary Indonesian
121, fall; 122, spring. 4 credits each term. Prerequisite: for INDO 122, INDO 121. J. Wolff and staff.
A thorough grounding is given in basic speaking and listening skills with an introduction to reading.

INDO 123 Continuing Indonesian
Fall. 4 credits. *Provides language qualification.* Prerequisite: INDO 122 or equivalent. Satisfactory completion of INDO 123 fulfills the qualification portion of the language requirement. J. Wolff and staff.
Improves speaking skills, such as fluency and pronunciation, focusing on verbal communication skills; offers a wide range of readings and sharpens listening skills.

INDO 203–204 Intermediate Composition and Conversation @
203, fall; 204, spring. 3 credits each term. *INDO 203 provides language proficiency.* Prerequisites: for INDO 203, INDO 123; for INDO 204, INDO 203 or permission of instructor. J. Wolff and staff.
Intermediate instruction in spoken and written grammar and reading comprehension.

INDO 205–206 Intermediate Indonesian @
205, fall; 206, spring. 3 credits each term. *INDO 205 provides language proficiency.* Prerequisites: for INDO 205, INDO 123 or equivalent; for INDO 206: INDO 205 or equivalent. Satisfactory completion of INDO 205 fulfills the proficiency portion of the language requirement. J. Wolff and staff.
This course develops all four skills: reading, writing, speaking, and comprehension.

INDO 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. J. Wolff.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

INDO 305–306 Directed Individual Study
305, fall; 306, spring. 2–4 credits. Prerequisites: INDO 301–302 and 303–304 or equivalent knowledge of Indonesian or Malay. J. Wolff and staff.
A practical language course on an advanced level in which the students read materials in their own field of interest, write reports, and meet with the instructor for two hours a week for two credits and twice a week for four credits.

Japanese

JAPAN 101–102 Elementary Japanese
101, fall; 102, spring. 6 credits each term. *JAPAN 102 provides language qualification.* Prerequisite for JAPAN 102: JAPAN 101 or placement by the instructor during registration period. Intended for beginners or for those who have been placed in the course by examination. You must enroll in lecture and 1 section. R. Sukle and staff.
A thorough grounding in all four language skills—speaking, hearing, reading, writing—at the beginning level, but with a special emphasis on oral communication and actual use of the language in social context. Homework for the course is largely work on the skill aspects of language through practice in the language lab with tapes or CD-ROM. The lecture provides explanation, analysis, and cultural background necessary for successful interaction with Japanese people. The sections are conducted entirely in Japanese. Materials covered are not the same as for JAPAN 141–142.

[JAPAN 121–122 Continuing Japanese
Fall. 6 credits. Prerequisite: placement by the instructor at beginning of semester. Sections will co-meet with JAPAN 101–102 sections. Not offered 2001–2002. Staff.
Accelerated training in listening, speaking, reading, and writing with special emphasis on oral communication. For students who have already acquired a limited facility in Japanese through residence in Japan or through brief formal study and require fewer contact hours per week.]

JAPAN 141–142 Beginning Japanese at a Moderate Pace
141, fall; 142, spring. 4 credits each term. Prerequisite for JAPAN 142: JAPAN 141 or placement by instructor during registration period. Y. Shirai and staff.
Beginning level training in listening, speaking, reading, and writing, with more emphasis on written skills than JAPAN 101–102. Classroom activities focus on oral communication skills. Homework for the course is largely written exercises. Fewer credits and fewer class contact hours than JAPAN 101–102; the course meets five hours per week (MTWRF). Materials covered are not the same materials as JAPAN 101–102.

JAPAN 201–202 Intermediate Japanese Conversation @
201, fall and summer; 202, spring and summer. 4 credits each term. *JAPAN 201 provides language proficiency.* Prerequisites: for JAPAN 201, JAPAN 102 or placement by the instructor during registration; for JAPAN 202, JAPAN 201 and 203 or placement by the instructor during registration. You must enroll in lecture and 1 section. Students enrolled in JAPAN 201 are strongly urged to enroll concurrently in JAPAN 203. Y. Katagiri.
Course topics include the reading of elementary texts with emphasis on practical materials, and the development of writing skills.

JAPAN 203–204 Intermediate Japanese Reading I @
203, fall; 204, spring. 2 or 3 credits each term. *JAPAN 203 provides language proficiency.* Prerequisites: for JAPAN 203, JAPAN 102, or placement by the instructor during registration; for JAPAN 204, JAPAN 203 or placement by the instructor during registration. You must enroll in lecture and 1 section. N. Nakada.
Reading of elementary texts emphasizing practical materials, with development of writing skills.

JAPAN 241–242 Intermediate Japanese at a Moderate Pace
241, fall; 242, spring. 4 credits each term. *JAPAN 241 provides language qualification. JAPAN 242@ provides language proficiency.* Prerequisites: for JAPAN 241, JAPAN 142 or placement by instructor during registration period; for JAPAN 242, JAPAN 241 or placement by instructor. Y. Kawasaki and K. Selden.
Training in listening, speaking, reading, and writing for those students who have acquired a basic beginning-level command.

[JAPAN 251–252 Elementary/Intermediate Japanese @
251, fall; 252, spring. 4 credits each term. *JAPAN 251 provides language proficiency.* Prerequisites: for JAPAN 251, JAPAN 160 or placement by instructor during registration period; for JAPAN 252, JAPAN 251, 102, or placement by instructor during registration period. Not offered 2001–2002. Y. Nakanishi-Whitman.
Training in listening, speaking, reading, and writing for those students who have acquired a basic beginning-level command. Provides an alternate choice for students who find it difficult to schedule the more intensive JAPAN 201/203 and 202/204 into their schedules: MBA students, engineering students, hotel school students, arts college students, and others identical with 541–552. Can be followed by JAPAN 351–352.]

JAPAN 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. Staff.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

JAPAN 301–302 Communicative Competence @
301, fall; 302, spring. 3 credits each term. Prerequisites: for JAPAN 301, JAPAN 202 and placement by the instructor during registration; for JAPAN 302, JAPAN 301 or placement by the instructor during registration. Y. Katagiri.
This is a course for students who have learned basic Japanese grammar and oral skill and would like to use the language for natural conversation and effective oral communication. The course is intended to: (1) expand vocabulary for daily life use; (2) brush up on knowledge of basic grammar for fluency; and (3) develop communicative skills for varied situations.

JAPAN 303–304 Intermediate Japanese Reading II @
303, fall; 304, spring. 4 credits each term. Prerequisites: for JAPAN 303, JAPAN 202 or placement by the instructor during registration; for JAPAN 304, JAPAN 303 or placement by the instructor during registration. Staff.
Reading of selected modern texts with emphasis on expository style.

JAPAN 401–402 Oral Narration and Public Speaking
401, fall; 402, spring. 2 credits each term. Prerequisites: for JAPAN 401, JAPAN 302 or placement by the instructor during registration; for JAPAN 402, JAPAN 401 or placement by the instructor during registration. N. Nakada.
Instruction in making and delivering socially appropriate and effective speeches, with emphasis on both the construction of discourse and Japanese patterns of oral delivery.

JAPAN 403–404 Advanced Japanese Reading @
403, fall; 404, spring. 4 credits each term. Prerequisite: JAPAN 304 or permission of instructor.
Section I: Area of Humanities. Cannot be used for distribution. Reading of selected modern texts with emphasis on expository style. K. Selden.

Section II: Area of Economics and Social Science. Cannot be used for distribution. Y. Kawasaki. Reading of selected modern texts with emphasis on expository style.

JAPAN 410 History of the Japanese Language (also LING 411) @ #
Fall. 4 credits. Prerequisite: permission of instructor. Offered alternate years. J. Whitman.
An overview of the history of the Japanese language followed by intensive examination of issues of interest to the participants. Students should have a reading knowledge of Japanese.

JAPAN 421–422 Directed Readings
421, fall; 422, spring. Credit TBA. Limited to advanced students. Prerequisite: placement by the instructor during registration. K. Selden.
Topics are selected on the basis of student needs.

Japanese FALCON (Full-year Asian Language Concentration)

Director: R. Sukle, 123 Rockefeller Hall; FALCON Secretary 125 Rockefeller Hall, 255–6457, e-mail: falcon@cornell.edu or www.arts.cornell.edu/asian/falcon.htm.

There are three small interactive classes per day conducted entirely in Japanese and one lecture conducted in English and Japanese. The interactive classes are conducted by experienced and highly trained teachers; the lecture is conducted by an expert in Japanese language structure. Two one-hour sessions in the language lab are required daily. Additional preparation time in the language lab is necessary in the evenings. Exposure to the language exceeds that of even students living and studying in Japan, providing over 1,800 hours of exposure throughout the full-year program. The extensive exposure and intensive work on the language allows students to develop a level of fluency, accuracy, and control of the language not achieved in any other type of academic settings. The course is designed to develop 'copability' in the students by bringing them up to the level where they will be able to successfully make further progress in the language on their own even if they do not have further formal instruction. The intensive nature of the program allows graduate students to complete their language work in minimal time and undergraduates, including freshmen, to achieve levels of Japanese that are far beyond what is normally achieved in a four-year program, provided they continue their study of Japanese after FALCON.

JAPAN 160 Introductory Intensive Japanese (FALCON)
Summer only. 8 credits. *Satisfies language qualification.* R. Sukle and staff.
(See general description above). This is the first term of the FALCON Program. It is a full-time, intensive, nine-week course which begins at the absolute beginning level, in speaking as well as rudimentary reading and writing. Formal application must be made to the program, but admission is open to all students, not just those planning to take the full-year program. Students completing this course and planning to continue at Cornell in the fall may continue with the fall and spring terms of FALCON (JAPAN 161 and 162), or they should consult the FALCON Director, Robert Sukle, at 255–0734 or rjs19@cornell.edu, about other options.

JAPAN 161–162 Intensive Japanese (FALCON) @
161, fall; 162, spring. 16 credits each term. *JAPAN 161 provides language proficiency.* Prerequisites: for JAPAN 161, JAPAN 160, or JAPAN 102 at Cornell, or placement by FALCON staff prior to beginning of fall term; for JAPAN 162, JAPAN 161, or placement by FALCON staff prior to beginning of spring term. Students must apply formally to program (see above); application open to all Cornell students and students from other institutions. R. Sukle and staff.
(See general description above). Work on spoken and written Japanese from an intermediate level to an advanced level. This is a full-time program and full academic load; the demands of the program do not normally permit students to take other courses simultaneously. With a sequence of 160–161–162, in only one calendar year a student can complete as much Japanese as would be contained in three or more years of regular study at most academic institutions. This course sequence also serves to fulfill the language requirement for the M.A. in Asian studies and the joint M.B.A./M.A. in Asian studies.

Literature in Japanese

JPLIT 406 Introduction to Classical Japanese @ #
Fall. 4 credits. Prerequisite: permission of instructor. K. Selden.
This course is an introduction to the fundamental grammar and vocabulary of classical Japanese.

JPLIT 408 Readings in Classical Japanese @ #
Spring. 4 credits. Prerequisite: JPLIT 406 or permission of instructor. K. Selden.
This course is intended for students who have completed the JAPAN 403/404 sequence or the equivalent. Readings of excerpts and complete brief pieces from representative premodern Japanese literature mostly with the use of standard modern annotated editions. Different selections and themes are introduced each year.

JPLIT 421–422 Directed Readings
421, fall; 422, spring. 2–4 credits. Prerequisite: for JPLIT 421, JAPAN 402 or equivalent; for JPLIT 422, JAPAN 421 or equivalent. Staff.
Students choose a faculty member to oversee this independent study. The student and the faculty member work together to develop class readings.

[JPLIT 611 Seminar in Classical Japanese Literature
Spring. 2–4 credits. Prerequisite: permission of instructor. Offered alternate years. Not offered 2001–2002. K. Brazell.
For advanced graduate students in the field of East Asian Literature. This seminar focuses on the reading of Japanese literary and literary-critical texts in relation to a selected topic in classical literature.]

[JPLIT 612 Seminar in Medieval Genres
Spring. 2–4 credits. Prerequisite: permission of instructor. Offered alternate years. Not offered 2001–2002. K. Brazell.
This seminar explores medieval literary genres in terms of the contemporary religious, social, political, and aesthetic discourses. Readings are in classical and modern Japanese as well as in English.]

JPLIT 613 Seminar in Tokugawa Culture and Thought
Spring. 2–4 credits. Prerequisite: permission of instructor. Offered alternate years. N. Sakai.
This seminar examines a variety of texts written during the Tokugawa period. The topics discussed in these are many: from the conceptualization of the virtue in the Confucian tradition, to the composition of Waka poetry. The texts are not selected from one school or from one teaching but encompass a wide range of intellectual trends including Neo-Confucianism, the Kogaku and the Kokugaku. In addition to the original texts of the Tokugawa period, we are going to read a few works of modern historiography on Tokugawa thought and culture. These works do not necessarily represent the standard of the present-day Tokugawa studies, but they clearly show different approaches. In this seminar, we evaluate critically these works through a careful reading of the original texts of the Tokugawa period.

JPLIT 614 Seminar in Modern Japanese Literature: Postmodern Thought for Area Studies (also COM L 695)
Spring. 4 credits. Prerequisite: permission of instructor. B. de Bary.
How might postmodern debates on language and difference transform our understanding of the project of cross-cultural learning institutionalized in postwar American area studies? Intended as an introductory course for graduate students, this class emphasizes weekly close readings of important primary texts which have grappled with, or attempted to challenge, epistemological assumptions, categories, and processes which have informed modern disciplinary knowledge of cultural others. Readings will include texts by Rey Chow, James Clifford, Jacques Derrida, Gayatri Spivak, and others.

JPLIT 624 Advanced Readings in Modern Japanese Literature
Spring. 4 credits. Prerequisite: permission of instructor. Offered alternate years. B. de Bary.
The course considers representations of the body and eroticism in fiction, poetry, film, and theoretical writings from the Taisho through early Showa periods (1912 to the late 1930s). Special attention is given to writings about the "New Woman" and "Modern Girl," to sexuality in modernist cinematic and literary experiments, and to reciprocal relations between colonial and metropolitan culture. All readings are done in Japanese.

JPLIT 625 Directed Readings
Fall or spring. 4 credits. Staff.
Students choose a faculty member to oversee this independent study. The student and the faculty member work together to develop class readings.

[JPLIT 700–701 Seminar: Reading of Historical Materials—Japanese Imperial Nationalism and Its Literature
700, fall; 701, spring. 4 credits. Not offered 2001–2002. N. Sakai.
Research readings for graduate level students.]

Javanese

[JAVA 131–132 Elementary Javanese
131, fall; 132, spring. 3 credits each term. Prerequisite: for JAVA 132, JAVA 131 or equivalent. This language series (131–132) cannot be used to satisfy the language requirement. Not offered 2001–2002. J. Wolff and staff.
An elementary language course for those who have had no previous experience in the language.]

[JAVA 133–134 Continuing Javanese
133, fall; 134, spring. 3 credits each term. *JAVA 134 provides language qualification.* Prerequisites: for JAVA 133, JAVA 132 or equivalent; for JAVA 134, JAVA 133 or equivalent. Satisfactory completion of JAVA 134 fulfills the qualification portion of the language requirement. Not offered 2001–2002. J. Wolff and staff.
An intermediate conversation and reading course.]

[JAVA 203–204 Directed Individual Study @
203, fall; 204, spring. 3 credits. *JAVA 203 provides language proficiency.* Prerequisite: JAVA 134 or equivalent. Not offered 2001–2002. J. Wolff and staff.
This is a practical language course on an intermediate level in which the students work through readings and conversations under the guidance of a native speaker for three contact hours a week.]

[JAVA 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. Not offered 2001–2002. J. Wolff.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.]

Khmer (Cambodian)

KHMER 101–102 Elementary Khmer
101, fall; 102, spring. 6 credits each term. *KHMER102 provides language qualification.* Prerequisite: for KHMER 102, KHMER 101 or equivalent. S. Son.
A course for beginners or for those who have been placed in the course by examination. The course gives a thorough grounding in speaking and reading.

KHMER [201]–202 Intermediate Khmer Reading @
201, not offered 2001–2002; 202, fall. 3 credits each term. *KHMER 201 provides language proficiency.* Prerequisites: for KHMER 201, KHMER 102; for KHMER 202, KHMER 201. S. Son.
Continuing instruction in spoken and written Khmer.

[KHMER 203–204 Intermediate Composition and Conversation @
203, fall; 204, spring. 3 credits each term. *KHMER 203 provides language proficiency.* Prerequisites: for KHMER 203, KHMER 102; for KHMER 204, KHMER 203. Not offered 2001–2002. Staff.
Letter writing and other forms of composition.]

KHMER 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. S. Son.
Taught on a specialized basis to address particular student needs. Times will be arranged with instructor.

KHMER 301–302 Advanced Khmer
301, 302, fall. 4 credits each term. Prerequisites: for KHMER 301, KHMER 202 or equivalent; for KHMER 302, KHMER 301. S. Son.
Continuing instruction in spoken and written Khmer; emphasis on enlarging vocabulary, increasing reading speed, and reading various genres and styles of prose.

[KHMER 401–402 Directed Individual Study
401, fall; 402, spring. For advanced students. 2–4 credits each term. Prerequisite: permission of instructor. Not offered 2001–2002. Staff.
Various topics according to need.]

Korean

KOREA 101–102 Elementary Korean
101, fall; 102, spring. 6 credits each term. *KOREA 102 provides language qualification.* Satisfactory completion of KOREA 102 fulfills the qualification portion of the language requirement. H. Diffloth and staff.
Covers basics of speaking, reading, and writing. Introduces Hangul writing system and grammar.

KOREA 109–110 Elementary Reading
109, fall; 110, spring. 3 credits each term. *KOREA 110 provides language qualification.* Prerequisite: permission of instructor. Satisfactory completion of KOREA 110 fulfills the qualification portion of the language requirement. H. Diffloth and staff.
This course is for students who have spoken some Korean in the home, but whose reading and writing skills are limited or nonexistent. If in doubt about eligibility, see instructor.

KOREA 201–202 Intermediate Korean @
201, fall; 202, spring. 4 credits each term. *KOREA 201 provides language proficiency.* Prerequisites: for KOREA 201, KOREA 102 or permission of instructor; for KOREA 202, KOREA 201. Satisfactory completion of KOREA 201 fulfills the proficiency portion of the language requirement. H. Diffloth and staff.
Covers the basics of speaking, reading, and writing at the intermediate level. Introduces some reading and writing with Chinese characters.

KOREA 209–210 Intermediate Reading @
209, fall; 210, spring. 4 credits each term. *KOREA 209 provides language proficiency.* Prerequisites: for KOREA 209, KOREA 110 or permission of instructor; for KOREA 210, KOREA 209 or permission of instructor. H. Diffloth and staff.
An intermediate level of reading comprehension and writing course for students who have acquired basic oral proficiency. Introduces some reading and writing with Chinese characters. If in doubt about eligibility, see instructor.

KOREA 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. H. Diffloth.
Taught on a specialized basis to address particular student needs. Times will be arranged with instructor.

KOREA 301–302 Advanced Korean
301, fall; 302, spring. 4 credits each term. Prerequisites: for KOREA 301, KOREA 202 or placement by instructor; for KOREA 302, KOREA 301 or placement by instructor. H. Diffloth and staff.
Reading of advanced texts, including newspapers and Chinese character material, together with advanced use of the spoken language.

KOREA 430 Structure of Korean (also LING 430)
Spring. 4 credits. Offered alternate years. J. Whitman.
See description under LING 430.

Literature in Korean

KRLIT 405 Readings in Korean Literature
Fall. 4 credits. Prerequisite: three years of Korean language study or permission of instructor. M. Shin.
Reading of a variety of prose works in modern Korean. Assignments are chosen from newspapers, magazines, short stories, novels, and academic texts.

[KRLIT 406 Korean Literature Translation Workshop @
Spring. 2–3 credits. Prerequisite: KOREA 301–302 or equivalent; permission of instructor. Not offered 2001–2002.]

Nepali

Study Abroad in Nepal

Cornell and the central campus of the Nepalese national university—Tribhuvan—at Kirtipur, Kathmandu, co-sponsor an academic year in Nepal. North American students study and live with Nepalese students who come from outside the Kathmandu Valley to Tribhuvan University. Students may participate in one or two semesters. Courses are offered both at Tribhuvan University and at the Cornell-Nepal Study Program House adjacent to the university. All courses are officially taught in English. A five-week, in-country orientation program includes classes in intensive Nepali conversation, cultural orientation programs, and a ten-day field trip and trek. Semester course offerings include Nepali language (Tibetan and/or Newari languages also possible), contemporary issues in Nepalese studies, field research design and methods in sociology/anthropology and ecology/environment, and guided field research.

Juniors and seniors in good academic standing from any major field may participate. Students must have a desire to study on the other side of the world, to participate in a multicultural program, and to undertake rigorous field research. No experience in Nepal is necessary and instruction is in English, but some prior Nepali language study is strongly recommended. Students interested in the study abroad in Nepal program should consult with the Cornell Abroad office (474 Uris Hall) for further information.

NEPAL 101–102 Elementary Nepali
101, fall; 102, spring. 6 credits each term. *NEPAL 102 provides language qualification.* Prerequisite: for NEPAL 102, 101 or examination. S. Oja.
Intended for beginners. The emphasis is on basic grammar, speaking, and comprehension skills, using culturally appropriate materials and texts. Devanagari script for reading and writing is also introduced.

NEPAL 160 Intensive Nepali
Summer only. 6 credits. Intended for beginners. Offered alternate years. S. Oja.
Emphasis is on the spoken language, in dialogues, exercises, and conversation practice. In addition, however, special attention is given to assisting students to develop vocabularies and abilities appropriate to their unique professional needs. Reading and writing practice use both colloquial and scholarly materials in the Nepali (Devanagari) script.

NEPAL 201–202 Intermediate Nepali Conversation @
201, fall; 202, spring. 3 credits each term. *NEPAL 201 provides language proficiency.* Prerequisites: for NEPAL 201, NEPAL 102 or examination; for NEPAL 202, NEPAL 201 or examination. S. Oja.
Intermediate instruction in spoken grammar and verbal comprehension skills, with special attention to developing technical vocabularies and other verbal skills appropriate to students' professional fields.

NEPAL 203–204 Intermediate Nepali Composition @
203, fall; 204, spring. 3 credits each term. *NEPAL 203 provides language proficiency.* Prerequisites: for NEPAL 203, NEPAL 102 or examination; for NEPAL 204, NEPAL 203 or examination. S. Oja.
A systematic review of written grammar and reading comprehension, with special attention to the technical vocabularies, necessary writing skills, and published materials typical of advanced students' professional fields.

NEPAL 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. S. Oja.
Taught on a specialized basis to address particular student needs. Times will be arranged with instructor.

NEPAL 301–302 Advanced Nepali
301, fall; 302, spring. 3 credits each term. Prerequisite: NEPAL 204 or permission of instructor. S. Oja.
Reading of advanced texts, together with advanced drill on the spoken language.

Pali

See also courses listed in this section under South Asian Languages.

[PALI 131–132 Elementary Pali
131, fall; 132, spring. 3 credits each term. ***This language series cannot be used to satisfy the language requirement.*** Not offered 2001–2002. Staff.
131 is an introduction to the language of the canonical texts of Theravada Buddhism. Reading of authentic texts of Theravada Buddhism. Emphasis on both content and grammatical structure. Familiarity with Sanskrit is not required. 132 is a continuation of 131 with further readings.]

PALI 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. D. Boucher.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

Sanskrit

SANSK 131–132 Elementary Sanskrit (also CLASS 131–132 and LING 131–132)
131, fall; 132, spring. 4 credits each term. *SANSK 132 provides language qualification.* Offered alternate years. C. Minkowski.
An introduction to the essentials of Sanskrit grammar. Designed to enable the student to read classical and epic Sanskrit as quickly as possible.

[SANSK 251–252 Intermediate Sanskrit (also CLASS 251–252 and LING 251–252) @ # IV
251, fall; 252, spring. 3 credits each term. *SANSK 251 provides language proficiency.* Prerequisite: SANSK 132 or equivalent. Offered alternate years. Not offered 2001–2002. C. Minkowski.
Readings from the literature of classical Sanskrit. Fall: selections from the two Sanskrit epics, the Mahabharata and the Ramayana. Spring: more selections from the epics and selections from either Sanskrit story literature or from Sanskrit dramas.]

Literature in Sanskrit

[SNLIT 467–468 Reading in Sanskrit Literature: The Vedas @ #
Spring. 3 credits. Prerequisite: permission of instructor. Not offered 2001–2002. C. Minkowski.
Readings in translation; readings in the original Vedic. Both courses must be taken as a sequence.]

Sinhala (Sinhalese)

SINHA 101–102 Elementary Sinhala
101, fall; 102, spring. 6 credits each term. *SINHA 102 provides language qualification.* Prerequisite: for SINHA 102, SINHA 101 or equivalent. Staff.
A semi-intensive course for beginners. A thorough grounding is given in all the language skills; listening, speaking, reading, and writing.

SINHA 160 Intensive Sinhala
Summer only. 6 credits. Intended for beginners. Offered alternate years.
Emphasis is on the spoken (colloquial) language, the writing system is introduced and used to present all Sinhala materials, with additional reading practice with colloquial materials. A foundation is laid for later study of the written language (literary Sinhala).

SINHA 201–202 Intermediate Sinhala Reading @
201, fall; 202, spring. 3 credits each term. *SINHA 201 provides language proficiency.* Prerequisites: for SINHA 201, SINHA 102; for SINHA 202, SINHA 201 or equivalent. Staff.

[SINHA 203–204 Intermediate Composition and Conversation @
203, fall; 204, spring. 3 credits each term. *SINHA 203 provides language proficiency.* Prerequisites: for SINHA 203, SINHA 102 or permission of instructor; for SINHA 204, SINHA 203 or equivalent. Not offered 2001–2002. Staff.]

SINHA 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. Staff.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

Southeast Asian Languages

[LING 230 Introduction to Southeast Asian Languages and Linguistics @ III
Fall. 3–4 credits variable. For nonmajors or majors. Not offered 2001–2002. A. Cohn, J. Wolff.
This is a survey of the languages of Southeast Asia. The goal of this course is to expose students to Southeast Asia as a linguistic area and introduce them to the rich language diversity of the region. It includes three main parts: (1) sociolinguistic and ethnolinguistic issues of language and politics, language and culture, and language use; (2) language structures and typological patterns of the area's languages; and (3) historical linguistics, as well as the linguistic effects of language contact and linguistic evidence for prehistory.]

[LING 653–654 Seminar in Southeast Asian Linguistics
653, fall; 654, spring. 4 credits each term. Prerequisite: permission of instructor. Language 653 isn't a prerequisite for Language 654. Not offered 2001–2002. J. Wolff.
Languages of mainland Southeast Asia. Topics, chosen according to student interests, may include description, dialectology, typology, comparative reconstruction, and historical studies.]

[LING 655–656 Seminar in Austronesian Linguistics (also LING 655–656)
655, fall; 656, spring. 4 credits each term. Prerequisites: for 655, permission of instructor, for 656, Language 655. Not offered 2001–2002. J. Wolff.
Descriptive and comparative studies of Malayo-Polynesian languages.]

Tagalog

TAG 121–122 Elementary Tagalog
121, fall; 122, spring. 4 credits each term. Prerequisite: for TAG 122, TAG 121. Staff.
A thorough grounding is given in basic speaking and listening skills with an introduction to reading.

TAG 123 Continuing Tagalog
Fall. 4 credits. *Provides language qualification.* Prerequisite: TAG 122 or equivalent. Satisfactory completion of TAG 123 fulfills the qualification portion of the language requirement. J. Wolff and staff.
Improves speaking skills, such as fluency and pronunciation, focusing on verbal communication skills; offers a wide range of readings; and sharpens listening skills.

TAG 205–206 Intermediate Tagalog @
205, fall; 206, spring. 3 credits each term. *TAG 205 provides language proficiency.* Prerequisites: for TAG 205, TAG 123 or equivalent; for TAG 206, TAG 205 or equivalent. Staff.
This course develops all four skills: reading, writing, speaking, and comprehension.

TAG 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. Staff.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

Thai

THAI 101–102 Elementary Thai
101, fall; 102, spring. 6 credits each term. *THAI 102 provides language qualification.* Prerequisite: for THAI 102, THAI 101 or equivalent. Intended for beginners or students placed by examination. N. Jagacinski.

A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

THAI 201–202 Intermediate Thai Reading @
201, fall; 202, spring. 3 credits each term. *THAI 201 provides language proficiency*. Prerequisites: for THAI 201, THAI 102; for THAI 202, THAI 201 or equivalent. N. Jagacinski.
Continuing instruction in spoken and written Thai.

THAI 203–204 Intermediate Composition and Conversation @
203, fall; 204, spring. 3 credits each term. *THAI 203 provides language proficiency*. Prerequisites: for THAI 203, THAI 102; for THAI 204, THAI 203. N. Jagacinski.
Intermediate instruction in spoken and written grammar and reading comprehension.

THAI 301–302 Advanced Thai
301, fall; 302, spring. 4 credits each term. Prerequisite: THAI 202 or equivalent. N. Jagacinski.
Selected readings in Thai writings in various fields.

THAI 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. N. Jagacinski.
Taught on a specialized basis to address particular student needs. Times will be arranged with instructor.

THAI 303–304 Thai Literature @
303, fall; 304, spring. 4 credits each term. Prerequisite: THAI 302 or equivalent. N. Jagacinski.
Reading of significant novels, short stories, and poetry written since 1850.

THAI 401–402 Directed Individual Study
401, fall; 402, spring. 4 credits each term. For advanced students or students with special problems or interests. Prerequisite: permission of instructor. N. Jagacinski.

Urdu

See listings under Hindi.

URDU 125 Introduction to the Urdu Script
Spring. 1 credits. Prerequisite: HINDI 101 or permission of instructor. M. Farooqi.
This course provides instruction in the basics of the Urdu script. It is intended primarily for students who have had some exposure to Urdu or Hindi but who have had little or **no** formal training in the script. The course focuses on mastering the script and pronunciation. It does not provide instruction in grammar.

Vietnamese

VIET 101–102 Elementary Vietnamese
101, fall; 102, spring. 6 credits each term. *VIET 102 provides language qualification.* Prerequisite: for VIET 102, VIET 101 or equivalent. Intended for beginners or students placed by examination. Satisfactory completion of VIET 102 fulfills the qualification portion of the language requirement. T. Tranviet.
A thorough grounding is given in all language skills: listening, speaking, reading, and writing.

VIET 201–202 Intermediate Vietnamese @
201, fall; 202, spring. 3 credits each term. *VIET 201 provides language proficiency.* Prerequisites: for VIET 201, VIET 102 or equivalent; for VIET 202, VIET 201. T. Tranviet.
Continuing instruction in spoken and written Vietnamese.

VIET 203–204 Intermediate Vietnamese Composition and Reading @
203, fall; 204, spring. 3 credits each term. *VIET 203 provides language proficiency.* Prerequisite: permission of instructor only. T. Tranviet.
Designed for students and "native" speakers of Vietnamese whose speaking and listening are at the advanced level, but who still need to improve writing and reading skills.

VIET 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. T. Tranviet.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

VIET 301–302 Advanced Vietnamese
301, fall or spring; 302, fall or spring. 3 credits each term. Prerequisites: for VIET 301, VIET 202 or permission of instructor; for VIET 302, VIET 301. T. Tranviet.
Continuing instruction in spoken and written Vietnamese; emphasis on enlarging vocabulary, increasing reading speed, and reading various genres and styles of prose.

VIET 401–402 Directed Individual Study
401, fall; 402, spring. 2–4 credits variable each term. Prerequisite: permission of instructor. Intended for advanced students. T. Tranviet.
Various topics according to need.

[VTLIT 222–223 Introduction to Classical Vietnamese @ #
222, fall; 223, spring. 3 credits. *VTLIT 222 provides language proficiency.* Prerequisite: qualification in Vietnamese or permission of instructor. Not offered 2001–2002. K. Taylor.
This is the first semester of a two-semester sequence of courses introducing students to Han (Classical Chinese as used in the Vietnamese language) and Nom (vernacular Vietnamese character writing). Students learn to read Han and Nom texts, mostly from the seventeenth through nineteenth centuries, including historical records, prose writings, and poetry.]

[VTLIT 224 Continuing Classical Vietnamese @ #
Fall. 3 credits. Not offered 2001–2002. K. Taylor.
This course continues study for students who have completed VTLIT 222–223 "Introduction to Classical Vietnamese."]

Related Courses in Other Departments and Colleges

Check the primary department section for the offering status of the following courses. Courses in other colleges will count as College of Arts and Sciences credit only for Asian Studies majors.

Asia/General Courses

ANTHRO 374 Human Palaeontology

AEM 464 Economics of Agricultural Development (also ECON 464)

AEM 665 Food and Nutrition Policy (also NS 685)

[AEM 666 Economics of Development (also ECON 466)]

AEM 667 Topics in Economic Development (also ECON 770)

COMM 424/624 Communication in the Developing Nations

[COMM 685 Training and Development: Theory and Practice (also INTAG 685 and EDUC 685)]

[CRP 777 Theories of Development and Underdevelopment]

ECON 473 Economics of Export-Led Development

[GOVT 349 Political Role of the Military]

[GOVT 648 Graduate Seminar in Political Economy of Change: Rural Development in the Third World]

GOVT 674 Theory and Practice of Nationalism

HIST 190 Introduction to Asian Civilization

HIST 495 Kings and States: Asian Models

ART H 280 Introduction to Art History: Approaches to Asian Art

ILRIC 637 Labor Relations in Asia

R SOC 205 Rural Sociology and International Development

China—Area Courses

ANTHR 655 East Asia: Readings in Specific Problems

ECON 469 Economy of China

ECON 772 Economics of Development

GOVT 334 Political Economy of East Asia

GOVT 347 Government and Politics of China

GOVT 382 International Relations of East Asia

GOVT 391 Chinese Foreign Policy

GOVT 437 Contemporary China: Society and Politics

[GOVT 438 Contemporary China: Political Economy]

GOVT 449/749 Politics and Magic: Popular Religion and Political Power in China

GOVT 642 Comparative Political Economy: East and Southeast Asia

GOVT 645 Chinese Politics

HIST 243 China and the West before Imperialism

HIST 293 History of China up to Modern Times

HIST 294 China in Modern Times

HIST 492 Undergraduate Seminar in Medieval Chinese History

HIST 493/693 Problems in Modern Chinese History
HIST 791–792 Seminar in Medieval Chinese History
ART H 380 Introduction to the Arts of China
ART H 481 The Arts in Modern China
ILRIC 332–532 Labor in Developing Economies
PAM 426 Policy & Management Issues on Foreign Investment in China

Japan—Area Courses

ANTHR 345 Japanese Society
ANTHR 655 East Asia: Readings in Specific Problems
ARCH 339 Elements, Principles, and Theories in Japanese Architecture
GOVT 346 Modern Japanese Politics
GOVT 382 International Relations of East Asia
GOVT 439 Japan in International Politics
GOVT 642 Comparative Political Economy: East and Southeast Asia
[HIST 230 Japan and the Pacific War]
HIST 297/497 Japan Before 1600
HIST 328 State, Society, and Culture in Modern Japan
HIST 420 Tale of Genji in Historical Perspective
HIST 489 Seminar in Modern Japanese History
HIST 798 Seminar in Japanese Thought
ILRHR 656 International Human Resource Management
ILRHR 690 Comparative Human Resource Management
ILRIC 333/533 Western Europe, United States, and Japan in a Changing World Economy
[MUSIC 481 Japanese Music: Style and Tradition]
NBA 580 Strategies for Global Competitiveness
[NBA 589 Business in Japan]

South Asia—Area Courses

[ANTHR 275 Human Biology and Evolution (also BIOES 275 and NS 275)]
[ANTHR 321 Sex and Gender]
ANTHR 339 Peoples and Cultures of the Himalayas
[ANTHR 406 Culture of Lives]
[ANTHR 621 Sex and Gender]
ANTHR 640–641 South Asia: Readings in Specific Problems
[ANTHR 673 Human Evolution: History, Concepts, and Theory (also BIOES 673)]
ARCH 342 Architecture as a Cultural System
ARCH 441–442 Special Topics in Architectural Culture and Society
ARCH 445 Architecture and the Mythic Imagination
ARCH 446 Topics in Architecture, Culture, and Society
ARCH 447 Architectural Design and the Utopian Tradition
ARCH 647–648 Architecture in its Cultural Context I & II
ARCH 649 Graduate Investigations in Architecture, Culture, and Society
ARCH 667–668 Architecture in Its Cultural Context
CRP 671 Seminar in International Planning
ECON 475 Economic Problems of India
HD 436 Language Development (also PSYCH 436 and LING 436)
HD 633 Seminar on Language Development

Southeast Asia—Area Courses

[ANTHR 322 Magic, Myth, Science, and Religion (also RELST 322)]
[ANTHR 335 People and Cultures of Mainland Southeast Asia]
ANTHR 420 Development of Anthropology Thought
[ANTHR 424 Anthropology Amongst Disciplines]
[ANTHR 619 Anthropology Approaches to Study of Buddhism(s) in Asia]
ANTHR 628 Political Anthropology: Indonesia
ANTHR 634–635 Southeast Asia: Readings in Special Problems
GOVT 642 Comparative Political Economy: East and Southeast Asia
HIST 244 History of Siam and Thailand
HIST 395 Southeast Asian History from the Eighteenth Century
HIST 695 Early Southeast Asia: Graduate Proseminar
HIST 696 Modern Southeast Asia: Graduate Proseminar
HIST 795–796 Seminar in Southeast Asian History
ART H 490 Art and Collecting: East and West
LING 230 Introduction to Southeast Asian Languages and Linguistics
MUSIC 245 Gamelan in Indonesian History and Cultures
MUSIC 445–446 Cornell Gamelan Ensemble
MUSIC 604 Ethnomusicology

ASTRONOMY

J. F. Veverka, chair (312 Space Sciences Building, 255–3507); M. P. Haynes, director of undergraduate studies (530 Space Sciences Building 255–0610); J. F. Bell, J. A. Burns, D. B. Campbell, D. F. Chernoff, J. M. Cordes, S. S. Eikenberry, E. E. Flanagan, P. J. Gierasch, R. Giovanelli, P. F. Goldsmith, T. L. Herter, J. R. Houck, D. Lai, R. V. E. Lovelace, P. D. Nicholson, C. J. Salter, S. W. Squyres, G. J. Stacey, Y. Terzian, S. A. Teukolsky, I. M. Wasserman. Emeritus: T. Gold, T. Hagfors, M. O. Harwit, E. E. Salpeter

Cornell's astronomy faculty, research staff, graduate, and undergraduate students are active in diverse areas of modern astronomy ranging from theoretical astrophysics and general relativity to radio and radar astronomy, infrared and optical astronomy, and the exploration of the solar system. Cornell operates two local optical observatories, the world's largest radio telescope at Arecibo, Puerto Rico, and with two other institutions, the 200-inch optical telescope at Mt. Palomar in California. Several members of the department faculty are also Principal Investigators on major NASA space and planetary exploration missions.

The department offers a number of courses to satisfy a general interest in astronomy. These courses have few or no prerequisites and are not intended for the training of professional astronomers. Among the introductory courses, several choices are available, depending on background and on the requirements to be fulfilled. The 100-level courses are designed primarily for nonscience majors. The alternative introductory sequence Astronomy 211–212 is geared toward sophomore physical science and engineering majors and requires coregistration in beginning calculus. Astronomy 201 and 202 are intended for students with an interest in astronomy but no scientific background; they are topical rather than survey-oriented. Astronomy 332 is designed for physical science and engineering majors as an introduction to astrophysics. Other courses at the 200 and 300 levels may appeal to students of various backgrounds and interests, as indicated in the individual course descriptions.

Courses numbered above 400 are intended for students who have had two to three years of college physics and at least two years of college mathematics. Astronomy 440, Independent Study, permits students to engage in individual research projects under the guidance of a faculty member.

Interested students are encouraged to become members of the undergraduate Cornell Astronomy Club. The club has access to the Fuertes Observatory on campus and conducts regular observing and astrophotography sessions. All students are invited to visit the Space Sciences Building, see the exhibits on display there, and consult faculty members about career plans or choice of courses.

The Major

The purpose of the major in astronomy is to provide in-depth knowledge and education about the nature of the universe. Astronomy relies heavily on preparation in physics and mathematics. Consequently, many courses in these fields are included as prerequisites. In preparation for the major, students normally elect the introductory physics sequence PHYS 112–213–214 or 116–217–218 and the complementary pathway in mathematics, MATH 111–122–221–222 or 191–192–293–294 (or equivalent). Students who anticipate undertaking graduate study are urged to elect the honors physics sequence PHYS 116–217–218–318–327 if possible. The sophomore seminar, ASTRO 233 "Topics in Astronomy and Astrophysics," provides an introduction to current research in astronomy and astrophysics for prospective majors, but is not required of students who elect to major in astronomy after the sophomore year. Students are also urged to acquire computer literacy. ASTRO 234 is designed to give students hands-on experience with the methods of analysis, visualization, and simulation needed in astrophysical research. Acceptance to the major is first considered after completion of three semesters of introductory physics and mathematics and in general requires a GPA of 3.2 in physics and mathematics courses.

The major requirements stress the importance of building a strong preparation in physical science. The following upper level courses are normally required:

PHYS 314 or 318, 316, 323 or 327, 341 and 443

A&EP 321–322 (or equivalent, e.g. MATH 420 and 422)

ASTRO 410, 431, and 432.

Upon consent of the major adviser, students interested in planetary studies may substitute appropriate advanced courses or may pursue an independent major under the program in the Science of Earth Systems. Majors are encouraged to supplement the above courses with any astronomy, physics, or other appropriate courses at or above the 300 level. Advanced seniors can enroll in astronomy graduate courses with the consent of the instructor. Students are also encouraged to work with faculty members on independent study projects under the course ASTRO 440 or to apply to a variety of programs at Cornell, Arecibo, and elsewhere that offer undergradu-

ates summer employment as research assistants. Nearly all undergraduate majors and concentrators become involved in research projects in the junior and senior years.

Students whose interest in astronomy is sparked somewhat late in their undergraduate career are encouraged to discuss possible paths with the Director of Undergraduate Studies in Astronomy.

Honors. A student may be granted honors in astronomy upon the recommendation of the Astronomy Advisers Committee of the astronomy faculty.

Double majors. A double major in astronomy and another subject is possible in many circumstances. However, the set of courses used to fulfill the requirements for each major must be completely independent.

Concentration. The concentration in astronomy for other majors normally requires 12 credits, at least eight of which must be at the 300 level or above. ASTRO 233 and 234 are recommended for sophomores planning to concentrate in astronomy.

Distribution Requirement

All courses in astronomy, except ASTRO 233 and 234, may be used to fulfill the science distribution requirement in the College of Arts and Sciences.

Courses

ASTRO 101 The Nature of the Universe (I)
Fall. 4 credits. No prerequisites. Labs limited to 18 students each and discussions limited to 30 students each. T. Herter, labs: J. Houck.
This course introduces students to the cosmos. The birth, evolution, and death of stars, the formation of the chemical elements, and the nature of white dwarfs, neutron stars, and black holes are discussed. An introduction to the theories of special relativity and general relativity is given. The course covers the search for other worlds outside the solar system and the possible existence of life and intelligence elsewhere in the universe. Modern theories of cosmology are presented, and the origin, structure, and fate of the universe are discussed. The full notes for the course as well as sample exams and simulations are made available on the web.

ASTRO 102 Our Solar System (I)
Spring. 4 credits. Labs limited to 18 students each; discussions limited to 30 students each. J. Bell; labs: J. Houck.
The past few decades have seen incredible advances in the exploration of our solar system. In this course students learn about the current state and past evolution of the Sun and its family of planets, moons, asteroids, and comets. The course emphasizes images and other data obtained from current and past NASA space missions and how these data provide insights about the important processes that have shaped the evolution of solar system objects. General astronomical concepts relevant to the study of the solar system are also discussed. Critical focus is on developing an understanding of the Earth as a planetary body and discovering how studies of other planets and satellites influence models of the climatic, geologic, and biologic history of our home world. Other topics covered include impact hazards, the search for life in the solar system, and future missions.

ASTRO 103 The Nature of the Universe (I)
Fall. 3 credits. T. Herter.
Identical to ASTRO 101 except for omission of the laboratory (see description above).

ASTRO 104 Our Solar System (I)
Spring. 3 credits. J. Bell.
Identical to ASTRO 102 except for omission of the laboratory.

ASTRO 105 An Introduction to the Universe (I)
Summer. 3 credits. J. Harrington.
How do we measure the size of our galaxy and the size of the universe? Is the universe round or flat? How are the stars born, why do they shine, and how do they die? What are the chemical elements, and how were they formed in stars? What are quasars, pulsars, and black holes? How was the solar system formed? What are the environments of other planets like? What is the basic structure of Earth and the other planets? Will we catastrophically alter the earth? Does life exist elsewhere in the universe? How can we find out? Each student has an opportunity to make observations with small telescopes.

ASTRO 106 Essential Ideas in Relativity and Cosmology (I)
Summer. 3 credits. Prerequisites: high school algebra and trigonometry. R. A. Saenz.
An explanation of Einstein's theories of special and general relativity, which brought about a fundamental change in our conceptual understanding of space and time. Correspondence to, and conflicts with, common sense. Applications to various areas in special relativity space travel, the equivalence of mass and energy, nuclear fission and fusion, and thermonuclear processes in the sun and in general relativity (motion of light and particles in curved space-time, cosmological models, and the question of whether the universe is open or closed).

ASTRO 107 An Introduction to the Universe (I)
Summer. 4 credits. J. Harrington.
Identical to ASTRO 105 except for the addition of the afternoon laboratory that emphasizes mathematical problem-solving. This option is recommended for potential majors in science and engineering.

ASTRO 195 Observational Astronomy (I)
Fall. 3 credits. Limited to 24 students. G. Stacey.
This course provides a "hands-on" introduction to observational astronomy intended for liberal arts students at the freshman and sophomore level. High school mathematics is assumed, but otherwise there are no formal prerequisites. The course objective is to teach how we know what we know about the universe. The course is set up with two lectures and one evening laboratory per week. Not all of the evening sessions will be used. Planned exercises include five or six observational labs (star gazing with binoculars and small telescopes, telescopic observations and CCD imaging of star clusters, nebulae, and the planets, solar observations, radio observations of the Milky Way Galaxy), plus a selection of exercises from the following: experiments in navigating by the stars; construction and use of simple instruments such as optical spectroscopes and sun dials; laboratory spectroscopy; experiments in planetary cratering; collection and study of micrometeorites; computer simulations of the orbits of planets and their satellites; and cosmological explorations using data from the Hubble Space Telescope available on the web.

ASTRO 201 Our Home in the Universe (I)
Fall. 3 credits. Assumes no scientific background. Course intended for freshmen and sophomores. R. Giovanelli, M. Haynes.
A general discussion of our relation to the physical universe and how our view of the universe has changed from ancient to modern times. Several main themes are covered over the course of the semester: the evolution of our view of the sky from that of ancient cultures to that of space telescopes; the death of stars and the formation of black holes; dark matter and the structure of galaxies; and the origin, evolution, and fate of the universe. We present a nonmathematical introduction to these subjects and discuss uncertainties and unresolved issues in our understanding.

ASTRO 202 Our Home in the Solar System (I)
Spring. 3 credits. Prerequisite: some background in science is required. Course intended for freshmen and sophomores. J. Veverka.
This writing course is designed to develop an understanding of our home planet as a member of a diverse family of objects in our solar system. Discussion centers on how studies of other planets and satellites have broadened our knowledge and perspective of Earth, and vice versa. We study, debate, and learn to write critically about important issues in science and public policy that benefit from this perspective. Topics discussed include global warming, the impact threat, the searches for extrasolar planets and extraterrestrial intelligence and the exploration of Mars.

ASTRO 211 Astronomy: Stars, Galaxies, and Cosmology (I)
Fall. 4 credits. Intended for engineering and physical sciences freshmen and sophomores. Prerequisite: introductory calculus or coregistration in MATH 111 or 191. D. Lai.
The formation and evolution of normal stars, supernovae, pulsars, and black holes. The interstellar medium. Cosmology and the structure and evolution of galaxies.

ASTRO 212 The Solar System: Planets, Satellites, and Rings (I)
Spring. 4 credits. Intended for first and second year engineering and physical sciences students. Prerequisite: introductory calculus or coregistration in MATH 111 or 191; some knowledge of classical physics (mechanics and thermodynamics). S. Squyres.
An introduction to the solar system, with emphasis on the application of simple physical principles. Topics include: the Sun, nucleosynthesis of the elements, radioactive dating, seismology and planetary interiors, planetary surfaces and atmospheres including greenhouse models, orbital mechanics and resonances, interrelations between meteorites, asteroids and comets, the Jovian planets, icy moons and ring systems, and the search for extra-solar planets.

ASTRO 233 Topics in Astronomy and Astrophysics
Fall. 2 credits. Prerequisites: PHYS 112 or 116 and 213 or 217, MATH 112, 122, or 192, or permission of instructor. Intended for sophomores planning to major in astronomy or related fields. M. Haynes, R. Giovanelli.
A seminar course on selected topics in astronomy and astrophysics designed for prospective astronomy majors. Content varies from year to year, but includes topics from the fields of planetary, galactic, and extragalactic research.

ASTRO 234 Modern Astrophysical Techniques
Spring. 2 credits. Prerequisites: 2 semesters of introductory physics and 2 semesters of calculus plus ASTRO 233 or permission of instructor. Some experience with computer programming expected. Intended for sophomores majoring or concentrating in astronomy or related fields. S. Eikenberry.
The course reviews the basic techniques employed in astrophysical research, both observational and theoretical, to explore the universe. Basic methods and strategies of data acquisition and image and signal processing are discussed. Students gain hands-on experience with visualization techniques and methods of error analysis, data fitting, and numerical simulation. Exercises address the processes by which astrophysicists piece together observations made with today's foremost astronomical instruments to solve questions concerning the origin of planets, stars, galaxies, and the universe itself.

ASTRO 280 Space Exploration (I)
Fall. 3 credits. S. Squyres.
This course provides an overview of space science, with particular emphasis on the solar system, and a detailed examination of a few selected objects, including the planet Mars, the satellites in the outer solar system, and comets. The focus is on methods of collecting information and especially on spacecraft and space missions. Topics include the design and limitations of instruments. Ethical and political questions associated with space exploration are discussed. Intended for students with an interest in science, technology, and associated policy issues. No special background in physical sciences, math, or engineering is assumed.

[ASTRO 290 Relativity and Astrophysics (I)
Spring. 4 credits. Prerequisites: knowledge of freshman physics, calculus, and geometry. Not offered 2001–2002. I. Wasserman.
This course provides a geometrically based introduction to special and general relativity, followed by consideration of astrophysical applications. Includes discussion of tests of Einstein's theory of space, time, and gravitation; the physics of white dwarfs, neutron stars, and black holes; an introduction to modern cosmology.]

[ASTRO 299 Search for Life in the Universe (I)
Spring. 4 credits. Prerequisites: 2 courses in any physical science subject or permission of instructors. Not offered 2001–2002. J. Cordes, Y. Terzian.
The contents of the universe is surveyed. Theories of cosmic and stellar evolution, and of the formation and evolution of planetary systems, planetary atmospheres, and surfaces are reviewed. Questions regarding the evolution of life and the development of technology are discussed. Methods to detect extraterrestrial life with emphasis on radio telescopes and associated instrumentation are presented. Hypothetical communication systems are developed and discussed.]

ASTRO 331 Climate Dynamics (also EAS 331) (I)
Fall. 4 credits. Prerequisite: MATH 112 or 192 or equivalent *or* instructor's approval. K. Cook, P. Gierasch
Processes that determine climate and contribute to its change are discussed, including atmospheric radiation, ocean circulation, and atmospheric dynamics. Contemporary climate change issues are investigated and discussed in the context of natural variability of the system.

ASTRO 332 Elements of Astrophysics (I)
Spring. 4 credits. Prerequisites: MATH 112, 122, 192, or equivalent. PHYS 213 or 217. P. Nicholson.
An introduction to astronomy, with emphasis on the application of physics to the study of the universe. Covers: physical laws of radiation; distance, size, mass, and age of stars, galaxies, and the universe; stellar evolution and nucleosynthesis; supernovae, pulsars, and black holes; galaxies and quasars. Introduction to cosmology. Mainly intended for students of science, engineering, and science education interested in astronomy and astrophysics.

ASTRO 342 Atmospheric Dynamics (also EAS 342) (I)
Spring. 3 credits. Prerequisites: 1 year each of calculus and physics. K. H. Cook, P. J. Gierasch.
Introduction to atmospheric dynamics and to the methods of description and quantitative analysis used in meteorology. Topics considered include: equations of atmospheric motion, vertical variations of wind and pressure fields, mathematical representation and characteristics of fronts, concepts of circulation and vorticity, and effects of friction on atmospheric motion. Applications and illustrations are drawn from both terrestrial and planetary examples.

ASTRO 410 Experimental Astronomy (I)
Fall. 4 credits. Prerequisites: PHYS 214/8 (or 310 or 360), PHYS 323/7 (or coregistration) or permission of instructor. J. Houck, S. Eikenberry, P. Goldsmith.
Observational astrophysics. Major experiments involve techniques in CCD (charge-coupled-device) imaging, optical photometry, optical spectroscopy, radiometry, radio spectroscopy and radio astronomy. The experiments involve use of the Hartung-Boothroyd Observatory's 24-inch telescope, a laboratory two-element radio interferometer, and a radio telescope mounted on top of the Space Sciences Building. The laboratory covers the fundamentals of using astronomical instrumentation and data analysis as applied to celestial phenomena: asteroids, normal stars, supernova remnants, globular clusters, planetary nebulae, the interstellar medium, OH masers, and galaxies.

ASTRO 431 Introduction to Astrophysics and Space Sciences (I)
Fall. 4 credits. Prerequisites: mathematics above the 200 level and physics above the 300 level; PHYS 443 is recommended. I. Wasserman.
A systematic development of modern astrophysical concepts for physical science majors. Stellar structure and evolution, stellar atmospheres, compact objects (white dwarf, neutron star, and black holes), planets, and brown dwarfs. Current research problems in these areas are introduced along the way. The emphasis is on using fundamental physics principles to explain astronomical phenomena. A variety of physics, including elements of general relativity, nuclear physics, solid state physics and fluid mechanics, are introduced or reviewed in a quick, practical fashion and put into use in solving astrophysics puzzles.

ASTRO 432 Introduction to Astrophysics and Space Sciences II (I)
Spring. 4 credits. Prerequisite: ASTRO 431 or permission of instructor. D. Chernoff.
This course is divided into two broad topics; the astrophysics of the interstellar medium and cosmology. The interstellar medium section covers thermal equilibrium and radiative transport in HII regions, atomic gas regions, and molecular clouds. The cosmology section includes expansion of the universe, metrics, Friedmann equations, dark matter, cosmological tests, the early universe, and the cosmological production of the elements.

[ASTRO 434 The Evolution of Planets (I)
Spring. 4 credits. Not offered 2001–2002. Staff.
An introduction to the physical and chemical processes that have been active in altering the environments of planets and satellites from their original to their present state. Theories of the formation of the solar system are revealed with special emphasis on chemical differentiation of the primeval solar nebula. A critical assessment is made of how well the various theories account for the clues left in the meteorite record and how well they explain the current environments of the planets and satellites. The main ideas about the formation and evolution of terrestrial planets, satellite systems, and asteroids are considered in detail. Some specific topics included are the history of the earth-moon system, the probable evolution of Jupiter's Galilean satellites, and the comparative histories of Venus, Earth, and Mars.]

ASTRO 440 Independent Study in Astronomy
Fall or spring. 2–4 credits. Prerequisite: permission of instructor. Recommended: familiarity with the topics covered in ASTRO 332, 431, or 434.
Individuals work on selected topics. A program of study is devised by the student and instructor. Students need to fill out an independent study form, have it signed by the instructor, and register in the department office, 610 Space Sciences Building.

ASTRO 490 Senior Seminar Critical Thinking (I)
Fall. 3 credits. Y. Terzian.
Critical thinking in scientific and nonscientific contexts. Topics include elements of classical logic, including standards of evidence and paradoxes. Case studies include examples of competing hypotheses in the history of science, as well as examples from borderline sciences. Stress will be put on creative generation of alternative hypotheses and their winnowing by critical scrutiny. Topics include the nature and history of the universe, the nature of time, the nature of reality, the possibilities of life on other planets, and

artificial intelligence. The course includes debates by the students.

[ASTRO 509 General Relativity
Fall. 4 credits. Not offered 2001–2002. E. Flanagan.
For description, see PHYS 553.]

[ASTRO 510 Applications of General Relativity
Spring. 4 credits. Not offered 2001–2002. E. Flanagan.
For description, see PHYS 554.]

[ASTRO 511 Physics of Black Holes, White Dwarfs, and Neutron Stars (also PHYS 525)
Fall. 4 credits. The minimum prerequisites for this course are all of the physics at the upper division undergraduate level. Not offered 2001–2002. D. Lai.
Compact objects (neutron stars, black holes and white dwarfs) are the endpoints of stellar evolution. They are responsible for some of the most exotic phenomena in the universe including: supernova explosion, radio pulsars, bright X-ray binaries, magnetars, gamma-ray bursts, and so on. Supermassive black holes also lie at the heart of the violent processes in active galactic nuclei and quasars. The study of compact objects allows one to probe physics under extreme conditions (high densities, strong magnetic fields, and gravity). This course surveys the astrophysics of compact stars and related subjects. Emphasis is on the application of diverse theoretical physics tools to various observations of compact stars. There are no astronomy or general relativity prerequisites. At the level of *Physics of Black Holes, White Dwarfs, and Neutron Stars* by Shapiro and Teukolsky.]

ASTRO 516 Galactic Structure and Stellar Dynamics (I)
Fall. 4 credits. D. Chernoff.
This course is an introduction to the study of the structure of galaxies via the laws of modern physics. Topics include the observed kinematics and spatial distribution of stars in the vicinity of the Sun, shapes and properties of stellar orbits, the gravitational N-body problem, collisional relaxation in stellar systems, spiral structure, galaxy classification and evolution, and cosmological results in galaxy formation.

ASTRO 520 Radio Astronomy
Fall. 4 credits. D. Campbell, P. Goldsmith.
Covers radio astronomy telescopes and electronics; antenna theory; observing procedures and data analysis; concepts of interferometry and aperture synthesis.

[ASTRO 523 Signal Modeling, Statistical Inference, and Data Mining in Astronomy
Spring. 4 credits. Not offered 2001–2002. J. Cordes.
The course aims to provide tools for modeling and detection of various kinds of signals encountered in the physical sciences and engineering. Data mining and statistical inference from large and diverse databases are also covered. Experimental design is to be discussed. Basic topics covered include: probability theory; Fourier analysis of continuous and discrete signals; digital filtering; matched filtering and pattern recognition; spectral analysis; Karhunen-Loeve analysis; wavelets; parameter estimation; optimization techniques; Bayesian statistical inference; deterministic, chaotic, and stochastic processes; image formation and analysis; maximum entropy techniques. Specific applications are chosen from current areas of interest in astronomy, where large-scale surveys throughout the electromagnetic spectrum and using non-electromagnetic signals (e.g., neutrinos and gravitational waves) are ongoing and anticipated. Applications are also chosen from topics in geophysics, plasma physics, electronics, artificial intelligence, expert systems, and genetic programming. The course is self-contained and is intended for students with thorough backgrounds in the physical sciences or engineering.]

ASTRO 525 Techniques of Optical/ Infrared and Submillimeter Astronomy
Spring. 4 credits. T. Herter, G. Stacey.
Optical/infrared and submillimeter telescopes and instrumentation are discussed and related to current research in these fields. The course includes telescope design and general optical design (ray tracing). CCD, photoconductor, photovoltaic, bolometer, impurity band conduction, and heterodyne detection systems are presented. The instrumentation discussion includes general instrument design and specific applications to cameras, spectrographs, and interferometers. Detection limits of various systems, cryogenic techniques, and astronomical data anlaysis techniques are also discussed. Special topics include speckle interferometry and adaptive optics.

ASTRO 530 Astrophysical Processes
Spring. 4 credits. D. Lai.
Thermal and nonthermal radiation processes encountered in studies of stars, the interstellar and intergalactic media, galaxies, and quasars. Fundamentals of radiative transfer, bremsstrahlung, synchrotron radiation, and Compton scattering are covered, as well as spectral line transfer, gas heating and cooling, and topics in atomic and molecular spectroscopy. These topics are discussed within the framework of astrophysical situations, such as star formation, interstellar gas and dust clouds, jets, active galactic nuclei, clusters of galaxies and cosmology.

[ASTRO 555 Theory of the Interstellar Medium
Spring. 4 credits. Not offered 2001–2002.
Covers global theories of the interstellar medium-mass and energy exchange between the different phases; the role of shock waves and energic outflows in the thermal equilibrium and ionization state of gas in the galaxy; basic astrophysical fluids and plasmas; galactic dynamics; and observation techiques, current problems and results.]

[ASTRO 560 Theory of Stellar Structure and Evolution (also PHYS 667)
Spring. 4 credits. Not offered 2001–2002.
This course is intended to provide a systematic development of stellar astrophysics, both theory and observations. Topics include: hydrostatic equilibrium; equation of state; radiation transfer and atmospheres; convection and stellar turbulence; nuclear burning and nucleosythesis; solar neutrinos; star formation; pre-main sequence stars; brown dwarfs; end states of stellar evolution (white dwarfs, neutron stars and black holes); supernovae; interacting binary stars; stellar rotation and magnetic fields; stellar pulsations; winds and outflows. The prerequisites for the course are all undergraduate level physics. Though helpful, no astronomy background is required.]

ASTRO 570 Physics of the Planets
Fall. 4 credits. P. Nicholson.
An introductory survey of planetary science with an emphasis on the application of physical principles. Planetary dynamics, including satellite orbits, tidal interactions, resonances, and ring dynamics. An introduction to the theory of planetary interiors, gravitational fields, heat sources, and rotational mechanics. Physics of planetary atmospheres, including radiative transfer, convection, and thermal structure. Important observational results, including those of ground-based optical, infrared, radio, and radar astronomy, as well as those made by spacecraft, are discussed. Intended for graduate students and seniors in astronomy, physics, and engineering.

[ASTRO 571 Mechanics of the Solar System (also T&AM 673)
Spring. 3 credits. Not offered 2001–2002. J. Burns.
Course topics include: gravitational potential, planetary gravity fields; free and forced rotations; Chandler wobble, polar wander, damping of nutation; equilibrium tidal theory, tidal heating; orbital evolution of natural satellites, resonances, spin-orbit coupling; Cassini states; long-term variations in planetary orbits; orbital and rotational chaos; dust dynamics; dynamics of ring systems; and seismic waves, free oscillations. Illustrative examples are drawn from contemporary research.]

[ASTRO 579 Celestial Mechanics
Fall. 3 credits. Not offered 2001–2002.
For description, See T&AM 672.]

[ASTRO 590 Galaxies and the Universe
Spring. 4 credits. Not offered 2001–2002. M. Haynes, T. Herter.
The universe, its constituents, its large-scale structure, and its history in the light of the major thrusts of extragalactic research. The morphology, photometry, dynamics, and kinematics of galaxies and their subsystems. Determination of masses, mass-to-light ratios, and the "missing mass." Activity in Seyferts, radio galaxies, and quasars. Binaries, groups, clusters, and superclusters. The extragalactic distance scale. Galaxy formation and evolution. Confrontation of cosmological theories with observational results.]

ASTRO 599 Cosmology (also PHYS 599)
Fall. 4 credits. Prerequisites: statistical physics, quantum mechanics and electromagnetic theory. I. Wasserman.
This course is intended to provide a detailed theoretical development of current ideas in cosmology. Topics include observational overview; growth of irregularities, galaxy formation, and clustering; big bang cosmology, recombination, nucleosynthesis; very early universe, symmetry breaking, inflationary scenarios. At the level of Peebles, *Principles of Physical Cosmology*.

[ASTRO 620 Seminar: Advanced Radio Astronomy
Fall. 2 credits. Prerequisites: some background in astronomical spectroscopy suggested. Open to advanced undergraduates by permission of instructor. W 2:30–4:30. Not offered 2001–2002.
Selected topics in the application of spectroscopic techniques from the infrared through radio regime to studies of the "dark ages" and the origin of galaxies, stars, and planets. We emphasize the processes of star formation

from the earliest times to the current circumstances of stellar and planetary formation in the Milky Way and other galaxies. Discussions include the potential of new facilities including the Arecibo and Green Bank telescopes, the Expanded VLA, the Atacama Large Millimeter Array, the Large Millimeter Telescope, the Square Kilometer Array, SIRTF, and the Cornell Atacama Telescope.]

ASTRO 621 Seminar: Planetary Radar Astronomy
Spring. 3 credits. Prerequisites: intended for graduate students and upper-level undergraduates in astronomy, engineering, and geology. A good background in undergraduate mathematics and physics is required. D. Campbell.
The application of radar to the study of the surfaces of planets, planetary satellites, asteroids, and comets. Topics covered target detectability and the specification of the needed antennas, transmitters, and receiving systems; data processing techniques; imaging techniques including delay-Doppler imaging, synthetic aperture radar (SAR) and interferometric SAR; target characterization from cross section, scattering laws and polarization measurements; results from earth-based and spacecraft radar observations of Mercury, Earth, the Moon, Mars, the satellites of Jupiter, the rings of Saturn, asteroids, and comets.

ASTRO 640 Advanced Study and Research
Fall or spring. Credit TBA.
Guided reading and seminars on topics not currently covered in regular courses. Students need to register in the department office, 610 Space Sciences Building.

[ASTRO 651 Atmospheric Physics (also EAS 651)
Fall. 3 credits. Not offered 2001–2002. K. Cook, S. Colucci, P. Gierasch.
For description, see SCAS 651.]

[ASTRO 652 Advanced Atmospheric Dynamics (also SCAS 652)
Spring. 3 credits. Offered alternate years, not offered 2001–2002. S. Colucci, K. Cook, P. Gierasch.
For description, see SCAS 652.]

[ASTRO 660 Cosmic Electrodynamics (also A&EP 608)
Spring. 2 credits. Not offered 2001–2002.]

ASTRO 671 Seminar: Spectroscopy of Planetary Surfaces
Fall. 3 credits. J. Bell.
Students review the physics behind remote sensing of the solid surfaces of the Moon, terrestrial planets, asteroids and comets. The class emphasizes relevant aspects of Crystal Field theory, Hapke theory, spectral analysis and classification, and measurement techniques. Examples of telescopic and spacecraft reflectance and thermal emission spectra are discussed.

ASTRO 673 Seminar: Planetary Atmospheres
Spring. 2 credits. P. Gierasch.
This course deals with motions in planetary atmospheres. Among the topics discussed are the Venus general circulation, dust and water transports on Mars, alternating jets on the outer planets, and compositional layering in the outer planets.

[ASTRO 690 Seminar: Computational Astrophysics (also PHYS 680)
Spring. 3 credits. Prerequisites: working knowledge of FORTRAN. Not offered 2001–2002. Staff.]

[ASTRO 699 Seminar: Problems in Theoretical Astrophysics (also PHYS 665)
Fall. 2 credits. Not offered 2001–2002. Staff.]

[ASTRO 699 Seminar: Observational High Energy Physics
Spring. 2 credits. ASTRO 511 (PHYS 525) is strongly recommended as a co- or prerequisite. Not offered 2001–2002. Staff.]

BIOLOGICAL SCIENCES

Biology is a popular subject at many universities for a variety of reasons: it is a science that is in an exciting phase of development; it prepares students for careers in challenging and appealing fields such as human and veterinary medicine, environmental sciences, and biotechnology; and it deals with the inherently interesting questions that arise when we try to understand ourselves and the living world around us. Many of the decisions we face today deal with the opportunities and problems that biology has put before us.

The major in biological sciences at Cornell is available to students enrolled in either the College of Agriculture and Life Sciences or the College of Arts and Sciences. Student services provided by the Office of Undergraduate Biology, 216 Stimson Hall, are available to students from either college.

The biology major is designed to enable students to acquire the foundations in physical and life sciences necessary to understand modern biology and to pursue advanced studies in a specific area of biology. Programs of study include animal physiology; biochemistry; computational biology; ecology and evolutionary biology; general biology; genetics and development; microbiology; molecular and cell biology; neurobiology and behavior; nutrition; plant biology; and systematics and biotic diversity. Students interested in the marine sciences may consult the Cornell Marine Programs Office (G14 Stimson Hall, 255–3717) for academic advice and career counseling. For more details about the biology curriculum, see the section in this catalog on Biological Sciences.

BIOLOGY AND SOCIETY MAJOR

See under Special Programs and Interdisciplinary Studies.

BURMESE

See Department of Asian Studies.

CAMBODIAN

See Department of Asian Studies.

CHEMISTRY AND CHEMICAL BIOLOGY

B. K. Carpenter, chair (122 Baker Laboratory, 255–4174); D. Y. Sogah, director of undergraduate studies; H. D. Abruña, A. C. Albrecht, B. A. Baird, T. P. Begley, J. M. Burlitch, B. K. Carpenter, R. A. Cerione, P. J. Chirik, J. C. Clardy, G. W. Coates, D. B. Collum, B. R. Crane, H. F. Davis, F. J. DiSalvo, S. E. Ealick, G. S. Ezra, R. C. Fay, J. H. Freed, B. Ganem, M. A. Hines, R. Hoffmann, P. L. Houston, S. Lee, R. F. Loring, S. T. Marcus (associate director of undergraduate studies), J. A. Marohn, T. McCarrick, J. E. McMurry, D. T. McQuade, J. Meinwald, S. O. Russo, D. Y. Sogah, D. A. Usher, B. Widom, C. F. Wilcox, P. T. Wolczanski, D. B. Zax

The Department of Chemistry and Chemical Biology offers a full range of courses in physical, organic, inorganic, analytical, theoretical, bioorganic, and biophysical chemistry. In addition to their teaching interests, Chemistry and Chemical Biology faculty members have active research programs. The link between teaching and research is a vital one in a continuously evolving scientific subject; it ensures that students will be provided with the most advanced information and perspectives, and affords opportunities for students to participate in research.

The Standard Major

The chemistry major at Cornell provides a great deal of flexibility and prepares students for a large variety of career options. In recent years, chemistry majors have gone on to graduate study in chemistry, medicine, law, and business management, as well as directly into positions with chemical, pharmaceutical, and other industrial companies. A major in chemistry can also provide the basis for work in related areas such as molecular biology, chemical physics, geochemistry, chemical engineering, materials science, solid state physics, and secondary education. Nearly all of the required courses for the major can be completed in three years, leaving the senior year open for advanced and independent work under the supervision of a professor.

The courses are arranged as a progression, with some (including mathematics and physics) prerequisite to those that are more advanced. During the first year, a student should normally register for general chemistry (preferably CHEM 215–216 although CHEM 207–208 or 206–208 is acceptable), mathematics, a freshman writing seminar, a foreign language if necessary, or physics. CHEM 215–216 is aimed at those students with good preparation and a strong interest in chemistry. Students who do not know if their preparation is adequate should consult the instructor. In the second year a student should complete calculus and take physics and organic chemistry (CHEM 359–360 is preferred to CHEM 357–358). The second-year laboratory courses include 300, Quantitative Chemistry and 301, Experimental Chemistry I. CHEM 389–390, Physical Chemistry I and II, and CHEM 302–303, Experimental Chemistry II and III, should be completed in the third year. CHEM 410 should be completed in the third or fourth year. Advanced work in chemistry and related subjects can be pursued in the fourth year and in the earlier years as well.

The opportunity for independent research is also available. All students with questions about the major are encouraged to consult the chair of the Department of Chemistry and Chemical Biology or the chair's representative. Entering students who are exceptionally well prepared in chemistry may receive advanced placement credit for CHEM 207.

Prerequisites for admission to a major in chemistry are (1) CHEM 215–216, 300; or 207–208, 300; or 211, 208, 300; or 206, 208, 300; (2) PHYS 207 or 112; and (3) MATH 111 or 191. Students are not encouraged to undertake a major in chemistry unless they have passed those prerequisite courses at a good level of proficiency. The minimum additional courses that must be completed for the standard major in chemistry are listed below.

1) CHEM 301–302–303, 359–360 (357–358 may be substituted), 389–390, and 410
2) MATH 112, 213; or 122, 221–222; or 192–293–294
3) PHYS 208

Potential majors electing to take MATH 213 are strongly urged to do so in their sophomore year to avoid scheduling conflicts with CHEM 389 in their junior year.

The sequence described above is a basic program in chemistry that students can extend substantially in whatever direction suits their own needs and interests. Those going on to do graduate work in chemistry should recognize that these requirements are minimal and should supplement their programs, where possible, with further courses such as CHEM 405, 605, 606, 665, 666, 668, and 681. Even students not planning graduate work in chemistry should consider advanced work in physics and mathematics, courses in the biological sciences, and advanced work in chemistry as possible extensions of the basic program.

Honors. The honors program in chemistry offers superior students in the standard major an opportunity to study independently in seminars and to gain additional experience by engaging in research during the senior year. It is particularly recommended to those who plan graduate work in chemistry. Prospective candidates should complete the introductory organic chemistry and physical chemistry sequences by the end of the junior year, although failure to have completed those courses in the junior year does not in itself disqualify a student from the honors program. Completion of the program at a high level of performance leads to the degree of Bachelor of Arts with honors in chemistry. Students will be admitted to the program by invitation of the department, with selection based on a superior cumulative average, including chemistry grades, and good performance in at least four credits of research at Cornell.

Prospective candidates should discuss their plans with advisers by March 1 of their junior year; participants are notified by early January of their senior year. To be awarded honors, candidates must show outstanding performance in at least eight credits of undergraduate research such as is offered in CHEM 421, 433, 461, or 477. In addition, the writing of a thesis in the honors seminar (CHEM 498) is expected.

The Alternative Major

The alternative major is a flexible program that provides core coverage of chemistry around which students can design a program to meet their own career goals. Requirements consist of a core program along with four additional courses chosen by the student. One of the four must be in chemistry at the 300 level or above; the other three may be in another field but should represent a cohesive plan and must be approved by a departmental committee.

The Core Program for the Alternative Major

1) CHEM 215–216, 300 (or 207–208, 300; or 211, 208, 300; or 206, 208, 300); 251, 257, 287, 289, and 410 (CHEM 357–358 or 359–360 can be substituted for CHEM 257, or CHEM 389–390 can be substituted for CHEM 287, thereby fulfilling the requirement for an additional 300-level chemistry course)
2) MATH 111–112; or 111, 122; or 191–192
3) PHYS 207–208; or 112, 213

Additional Courses for the Alternative Major

Possible plans for the remaining three courses might include programs in Biochemistry; Biology; Physics; Computer Science; Polymers; Materials Science; Science, Technology, and Society; History and Philosophy of Science and Technology; Business and Management; Economics; Education; and others.

Premedical students and those interested in pursuing double majors might find the alternative major particularly attractive. The course requirements for admission to the alternative major are the same as those for the standard major.

Program for Science Teachers

Chemistry majors who wish to become teachers will be interested to know that Cornell University offers a certification program for teachers of secondary (grades 7–12) science. Interested students apply to the program during their sophomore or junior years. If accepted, students integrate some course work in Education with the rest of their undergraduate studies. All chemistry majors who enter this program will remain in the College of Arts and Sciences to complete the major.

After earning the bachelor's degree, certification students enter the Graduate Field of Education to complete a fifth year of study at Cornell. Following this fifth year, students are eligible for a master's degree from Cornell and a teaching certificate from New York State. Additional information is available from Susie Slack, 424 Kennedy Hall, 255–9255 or Prof. Deborah Trumbull, 426 Kennedy Hall, 255–3108.

Laboratory Course Regulations

Students registered for laboratory courses who do not appear at the first meeting of the laboratory will forfeit their registration in that course.

Students and members of the teaching staff are required to wear safety goggles and lab aprons in all chemistry laboratories. Close-toed footwear is required (no sandals). Students are reminded to take their goggles and lab aprons to the first laboratory session. Those who fail to cooperate with the safety program will be asked to leave the laboratories.

Students are required to pay for glassware and any other items broken or missing from their laboratory desks at the close of each semester. Students who fail to inventory their desks at the appointed time in the presence of their instructor are charged a $10 fee in addition to charges for any breakage.

Courses

Note: Class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

Preliminary examinations for all courses may be given in the evening.

[CHEM 105 The Language of Chemistry (I)
Fall. 3 credits. This course contributes to satisfying the CALS physical science requirement of one course in chemistry. S-U or letter grades. Lecs, M W F 12:20. Prelims: in normal class period at 12:20 P.M. Not offered 2001–2002; next offered fall 2002. Staff.
In his autobiography, A. Kornberg (Nobel Laureate in Medicine, 1959) wrote, "much of life can be understood in rational terms if expressed in the language of chemistry. It is an international language, a language for all time, a language that explains where we came from, what we are, and where the physical world will allow us to go." Through careful examination of a few milestone investigations of naturally occurring biologically important compounds (such as the antimalarial quinine, bombykol, and the sperm attractants of algae), the principles of chemistry to which Kornberg refers are developed. Methods of analyzing chemical problems are emphasized, rather than the memorization of specific results or formulas. There is an opportunity for students, working in small groups, to prepare and present short reports on topics of particular current interest at the interface between chemistry and biology.]

CHEM 106 The World of Chemistry (I)
Spring. 3 credits. This course contributes to satisfying the CALS physical science requirement of one course in chemistry. S-U or letter grades. Lecs, M W F 1:25. Prelims: 7:30–9 P.M., March 5, April 4. R. Hoffman.
Chemistry is the art, craft, business, and science of substances and their transformations. And, ever since we've learned to look inside, we know those substances are molecular, and chemistry is also played out on the microscopic level. This is a course that looks at the way chemistry enters all aspects of the everyday world. In CHEM 106 students gain a feeling for the way science is done and grasp the interplay of chemistry and biology. They come to understand the central place of chemistry in culture and in the economy. The teaching is open and unintimidating, and there are many live demonstrations, as well as excerpts from poems, plays, and movies.

CHEM 206 Introduction to General Chemistry (I)
Fall or summer. 4 credits. Enrollment limited. Recommended for students who have not had high school chemistry and for those needing a less intensive course than CHEM 207. Lecs, M W F 11:15; lab, T R or F 8:00–11:00, or M W or F 1:25–4:25.

Prelims: 7:30–9 P.M., Oct. 11, Nov. 15. C. F. Wilcox.

An introduction to general chemistry, with emphasis on important principles and facts. CHEM 206 covers much of the same material as CHEM 207 plus the basics of chemical equilibrium, but does so at a slower pace.

CHEM 207–208 General Chemistry (I)

Fall or summer, 207; spring or summer, 208. 4 credits each term. Recommended for those students who will take further courses in chemistry. Prerequisite for CHEM 207: high school chemistry. Prerequisite for CHEM 208: CHEM 206 or 207. Lecs, T R 10:10 or 12:20; lab, T R F 8–12 or M T W R F 12:20–4:25. Prelims: 7:30–9 P.M., Oct. 11, Nov. 15, Feb. 26, April 9. Fall: J. E. McMurry; spring: M. A. Hines.

Fundamental chemical principles and descriptive facts are covered, with considerable attention given to the quantitative aspects and to the techniques important for further work in chemistry. Second-term laboratory includes a systematic study of qualitative analysis.

Note: Entering students exceptionally well prepared in chemistry may receive advanced placement credit for General Chemistry 207 by demonstrating competence in the advanced placement examination of the College Entrance Examination Board or in the departmental examination given at Cornell before classes start in the fall. Taking CHEM 208 after 215 is not recommended and can be done only with the permission of the 208 instructor.

CHEM 211 Chemistry for the Applied Sciences (I)

Fall or spring. 4 credits. Recommended for those students who intend to take only one term of chemistry. Enrollment limited. Prerequisite: high school chemistry or permission of instructor. Corequisite: a calculus course at the level of MATH 111 or 191. Lecs, fall, M W F 12:20; spring, M W F 11:15. Labs, M T W R F 1:25–4:25. Prelims: 7:30–9 P.M., Sept. 25, Oct. 25, Nov. 29, Feb. 14, Mar. 12, Apr. 11. Fall: P. T. Wolczanski; spring: J. Marohn.

Important chemical principles and facts are covered with the objective of understanding the role of chemistry in other fields. Emphasis is on topics such as solid-state materials, periodic trends, and specific classes of compounds, such as polymers.

Note: Entering students exceptionally well prepared in chemistry may receive advanced placement credit for General Chemistry by demonstrating competence in the advanced placement examination of the College Entrance Examination Board or in the departmental examination given at Cornell before classes start in the fall.

CHEM 215–216 General and Inorganic Chemistry (I)

Fall, 215; spring, 216. 4 credits each term. Recommended for students who intend to specialize in chemistry or in related fields. Enrollment limited. Prerequisites: good performance in high school chemistry, physics, and mathematics. Corequisite: a calculus course at the level of MATH 111 or 191 for students who have not taken high school calculus. Prerequisite for CHEM 216: CHEM 215. Lecs, M W F 12:20; lab, M T W R or F 1:25–4:25. Prelims: 7:30–9 P.M., Oct. 11, Nov. 15, Feb. 14, Mar. 12, Apr. 11. Fall: B. Widom; spring: B. R. Crane.

An intensive systematic study of the laws and concepts of chemistry, with considerable emphasis on quantitative aspects. Second term includes systematics of inorganic chemistry. Laboratory work covers qualitative and quantitative analysis, transition metal chemistry, and spectroscopic techniques.

Note: Taking CHEM 208 after 215 is not recommended and can be done only with the permission of 208 instructor.

[CHEM 233 Introduction to Biomolecular Structure

Fall. 2 credits. Limited to 30 students. Prerequisites: CHEM 207–208 or equivalents. Lecs, T R 2:30–3:20. Not offered 2001–2002. S. E. Ealick.

This course is intended for students with a basic understanding of chemistry who are considering a program of study in biochemistry. The interrelationship of the structure and function of biologically important molecules are explored. Emphasis is placed on understanding the way in which the three-dimensional arrangements of atoms determine the biological properties of both small molecules and macromolecules such as proteins and enzymes. The study of molecular structure is aided by interactive computer graphics for visualizing three-dimensional structures of molecules.]

CHEM 251 Introduction to Experimental Organic Chemistry

Fall, spring, or summer. 2 credits. Recommended for non-chemistry majors. Enrollment limited. Prerequisites: coregistration in CHEM 257 or 357. Lecs: fall, R 11:15 or F 8:00; spring, F 8; lab, M T W R or F 1:25–4:25, or T or R 8–11. Prelims: 7:30–9 P.M., Fall: Nov. 15. Spring: Apr. 16. S. Russo.

Introduction to the synthesis, separation, and handling of materials, including applications of many types of chromatography, simple and fractional distillation, crystallization, extraction, and others.

CHEM 252 Elementary Experimental Organic Chemistry

Spring. 2 credits. Recommended for non-chemistry majors. Prerequisite: CHEM 251. Lec, R 11:15; lab, T 8–11, W 1:25–4:25. Prelims: 7:30–9 P.M. Apr. 16. S. Russo.

A continuation of CHEM 251.

CHEM 257 Introduction to Organic and Biological Chemistry (I)

Spring. 3 credits. Prerequisite: CHEM 206 or 207. Because CHEM 257 is only a 3-credit course, it does not provide a practical route to satisfying medical school requirements. Lecs, M W F 12:20. Prelims: 7:30–9:00 P.M. March 5, April 9. D. A. Usher.

An introduction to organic chemistry with an emphasis on those structures and reactions of organic compounds having particular relevance to biological chemistry.

CHEM 287–288 Introductory Physical Chemistry (I)

Fall, 287; spring, 288. 3 credits each term. Prerequisites: CHEM 208 or 216 and MATH 111–112 and PHYS 208, or permission of instructor. Prerequisite for CHEM 288: CHEM 287 or 389. Lecs, M W F 9:05; 287: rec, M or W 1:25, T 9:05; 288: rec, M or W 1:25. Prelims: 7:30–9 P.M., 287: Oct. 16, Nov. 29. 288: Mar. 7, Apr. 16. Fall: A. C. Albrecht; spring: J. H. Freed.

A systematic treatment of the fundamental principles of physical chemistry, focusing in the fall on thermodynamics and an introduction to quantum mechanics. In the spring the course is oriented to the application of physical chemistry to biological systems, including transport, kinetics, electrochemistry, spectroscopy. CHEM 287 satisfies the minimum requirement for physical chemistry in the alternative chemistry major.

CHEM 289–290 Introductory Physical Chemistry Laboratory

Fall, 289; spring, 290. 2 credits each term. Lecs: fall, R 8:00 A.M.; spring, R 8:00 or 9:05. Lab: fall, M T 1:25–4:25; spring, M T W R 1:25–4:25. T. McCarrick.

A survey of the methods basic to the experimental study of physical chemistry, with a focus on the areas of kinetics, equilibrium, calorimetry, and molecular spectroscopy.

CHEM 300 Quantitative Chemistry

Fall. 2 credits. Prerequisite: CHEM 208, or CHEM 216 or advanced placement in chemistry. Lec, R 10:10; lab, M T W R 12:20–4:25 or T 8–12. Prelim: 7:30–9 P.M., Oct. 25, Nov. 29. J. M. Burlitch.

Volumetric, spectrophotometric, and potentiometric methods are emphasized. Techniques are learned by analysis of knowns, and then are used on unknowns. Lectures and problem sets stress the relationship between theory and applications.

CHEM 301 Experimental Chemistry I (I)

Spring. 4 credits. Prerequisites: CHEM 300, and 357 or 359. Lec, M W F 12:20; 2 labs, M W 1:25–4:25 or T R 8–11 or T R 1:25–4:25. J. M. Burlitch.

An introduction to the techniques of synthetic organic chemistry. A representative selection of the most important classes of organic reactions is explored in the first half of the semester, augmented by lectures on the reaction chemistry and the theory of separation and characterization techniques. The second half of the term is devoted to a special project, part of which is designed by the student. An opportunity to use inert atmosphere techniques is included.

CHEM 302 Experimental Chemistry II (I)

Fall. 4 credits. Enrollment limited; preference given to chemistry majors. Prerequisite: CHEM 301. Lecs, M W F 9:05; 2 labs, M W 1:25–4:25, T R 8–11 or T R 1:25–4:25. F. J. DiSalvo.

Instrumental methods of analysis, including chemical microscopy, UV, IR, and AA spectroscopies, and gas chromatography. The design, execution, and analysis of experiments is stressed.

CHEM 303 Experimental Chemistry III (I)

Spring. 4 credits. Each lab limited to 10 students. Prerequisites: CHEM 302, 389, 390; coregistration in the latter is permissible. Lecs, M W F 9:05; 2 labs, M W 1:25–4:25, or T R 9:00–12 or T R 1:25–4:25. H. D. Abruña.

An introduction to experimental physical chemistry, including topics in calorimetry, spectroscopy, and kinetics. The analysis and numerical simulation of experimental data is stressed.

CHEM 357–358 Organic Chemistry for the Life Sciences (I)
Fall or summer, 357; spring or summer, 358. 3 credits each term. Prerequisite for CHEM 357: CHEM 208 or 216 or advanced placement; recommended: concurrent registration in CHEM 251 or 300. Prerequisite for CHEM 358: CHEM 357 or permission of the instructor. Lecs, M W F 9:05 or 10:10, optional rec may be offered. Prelims: 7:30–9 P.M., Oct. 4, Oct. 23, Nov. 20, Feb. 14, Mar. 12, Apr. 11. Fall: T. Ruttledge; spring: J. Meinwald.
A study of the more important classes of carbon compounds—especially those encountered in the biological sciences. Emphasis is placed on their three-dimensional structures, mechanisms of their characteristic reactions, their synthesis in nature and the laboratory, methods of identifying them, and their role in modern science and technology.

Note: Because of duplication of material, students who take both CHEM 257 and 357 will receive graduation credit only for CHEM 257.

CHEM 359–360 Organic Chemistry I and II (I)
Fall, 359; spring, 360. 4 credits each term. Recommended for students who intend to specialize in chemistry or closely related fields. Enrollment limited. Prerequisites: CHEM 216 with a grade of B or better, CHEM 208 with a grade of A or better, or permission of instructor. Prerequisite for CHEM 360: CHEM 359. Recommended: coregistration in CHEM 300–301–302. Lecs, M W F 9:05; dis sec, W 7:30 P.M.; prelims, 7:30–9:00 P.M., Sept. 19, Oct. 17, Nov. 14, Spring: 7:30–9:00 P.M., Feb. 13, Mar. 13, Apr. 17. Fall: D. Ganem; spring, G. W. Coates.
A rigorous and systematic study of organic compounds, their structures, the mechanisms of their reactions, and the ways they are synthesized in nature and in the laboratory.

CHEM 389–390 Physical Chemistry I and II (I)
Fall, 389; spring, 390. 4 credits each term. Prerequisites: MATH 213 or, ideally, 221–222; PHYS 208; CHEM 208 or 216 or permission of instructor. Prerequisite for CHEM 390: CHEM 389. Lecs, 389: M W F 10:10; rec M or W 1:25 or T 9:05. Lecs, 390: M W F 10:10; prelims: 7:30–9 P.M. 389: Oct. 2, Oct. 30, Nov. 29. 390: Feb. 14, Mar. 12, Apr. 11. Fall: P. L. Houston; spring: 390: H. F. Davis.
The principles of physical chemistry are studied from the standpoint of the laws of thermodynamics, kinetic theory, statistical mechanics, and quantum chemistry.

CHEM 391 Physical Chemistry II (also CHEME 391) (I)
Spring. 4 credits. Enrollment limited to engineering students only. Prerequisites: MATH 293; PHYS 112, 213; CHEM 208 or 216 or permission of instructor. Corequisite: MATH 294. Prerequisite for CHEM 391: CHEM 389. Lecs, M W F 9:05; rec M 1:25 or T 9:05; T. M. Duncan.
Course is the study of two topics: (1) Quantum chemistry—the electronic structure of atoms, molecules, and condensed matter; the interaction of electromagnetic radiation with matter for spectroscopy and chemical reaction; and (2) Chemistry kinetics—reaction rate laws from experimental data and reaction mechanisms; approximation methods and applications to polymerization and heterogeneous catalysis.

CHEM 404 Entrepreneurship in Chemical Enterprise
Spring. 1 credit. Lecs, T 2:55–4:10. B. Ganem.
Designed to acquaint students with the problems of planning, starting, and managing a new scientifically oriented business venture, the course consists of six weekly 90-minute meetings focusing on case studies and assigned reading, as well as outside lectures by entrepreneurs in the chemical, pharmaceutical, and biotechnology industries. Topics include new technology evaluation and assessment, business formation, resource allocation, management development, as well as manufacturing and sales issues.

[CHEM 405 Techniques of Modern Synthetic Chemistry (I)
Spring. 3 or 6 credits. Enrollment limited. Prerequisites: CHEM 302 *and* permission of instructor. To receive 3 credits, students must perform a minimum of three 2-week experiments. 6 credits will be given for 3 additional experiments. Completion of 5 exercises in elementary glass-blowing will count as 1 experiment. Lab time required: 16 hours each week, including at least two 4-hour sessions in 1 section (M W 1:25). First meeting will be at 1:30 on first class day of semester. Lec, first week only, at times TBA. Not offered 2001–2002. J. M. Burlitch.]

CHEM 410 Inorganic Chemistry (I)
Fall. 4 credits. Prerequisites: CHEM 358 or 360, and 287 or 390. Lecs, M W F 11:15. Prelims: 7:30–9:00 P.M., Sept. 25, Oct. 25, Nov. 20. R. C. Fay.
A systematic study of the synthesis, structure, bonding, reactivity, and uses of inorganic organometallic, and solid-state compounds.

CHEM 421 Introduction to Inorganic Chemistry Research
Fall or spring. 2–4 credits. Prerequisites: CHEM 303 and 389–390, or CHEM 287–288, and CHEM 289–290 with an average of B– or better, or permission of instructor. Selected faculty.
Research in inorganic chemistry involving both laboratory and library work, planned in consultation with a faculty member.

CHEM 433 Introduction to Analytical Chemistry Research
Fall or spring. 2–4 credits. Prerequisites: CHEM 303 and 390 with an average of B– or better or permission of instructor. Selected faculty.
Research in analytical chemistry involving both laboratory and library work, planned in consultation with a faculty member.

CHEM 450 Principles of Chemical Biology (I)
Fall. 3 credits. Prerequisites: CHEM 357–358, CHEM 359–360 or equivalent. Lecs, T R 10:10–11:25. J. C. Clardy.
Biological processes are increasingly understood in chemical terms, and this course introduces some of the most important chemical approaches to biological processes. Topics such as structure-based drug design, small molecule mediators or protein-protein interaction, combinatorial synthesis, chemical genetics, conformational analysis of biological molecules, and the molecules transfer of biological information are covered.

CHEM 461 Introduction to Organic Chemistry Research
Fall or spring. 2–4 credits. Prerequisites: CHEM 302 and 358 or 360 with a grade of B– or better or permission of instructor. Selected faculty.
Research in organic chemistry involving both laboratory and library work, planned in consultation with a faculty member.

CHEM 477 Introduction to Physical Chemistry Research
Fall or spring. 2–4 credits. Prerequisite: CHEM 390 with an average of B– or better or permission of instructor. Selected faculty.
Research in physical chemistry involving both laboratory and library work, planned in consultation with a faculty member.

CHEM 498 Honors Seminar
Spring. No credit. Admission to standard chemistry majors only by departmental invitation. Additional prerequisites or corequisites: outstanding performance in either (1) two coherent 4-credit units of research in a course such as CHEM 421, 433, 461, or 477; or (2) one 4-credit unit in a course such as CHEM 421, 433, 461, or 477 and summer research equivalent to at least 4 credits in the same subject. W 2:30–4. R. F. Loring.
Informal presentations and discussions of selected topics in which all students participate. Professional issues are discussed, including graduate education, publication, techniques of oral and audiovisual presentation, employment, ethics, chemistry in society, and support of scientific research. Individual research on advanced problems in chemistry or a related subject under the guidance of a faculty member, culminating in a written report.

CHEM 600–601 General Chemistry Colloquium
Fall, 600; spring, 601. No credit. R 4:40. Staff.
A series of talks representative of all fields of current research interest in chemistry given by distinguished visitors and faculty members.

CHEM 602 Information Literacy for the Physical Scientist
Spring. 1 credit. Primarily for first-year graduate students and undergraduate chemistry majors doing research. Lec, T 4:45–6:00. L. Solla.
An introduction to physical science information research methods, including use of paper and electronic resources. With the continued information explosion, much time can be wasted and important information missed unless an efficient information research strategy is developed. This course demonstrates the use of library and other information resources as a method to critically evaluate the success of research projects.

CHEM 605 Advanced Inorganic Chemistry I: Symmetry, Structure, and Reactivity
Fall. 4 credits. Prerequisite: CHEM 389–390 or equivalent or permission of instructor. Lecs, M W F 11:15. P. J. Chirik.
Selected topics in modern inorganic chemistry. Group theory applications: hybrid orbitals, molecular orbitals, molecular vibrations and spectroscopy with emphasis on modern coordination compounds. Reading's at the level of Jordan's *Reaction Mechanisms of Inorganic* and *Organometallic Systems,* and

Cotton's *Chemical Applications of Group Theory.*

[CHEM 606 Advanced Inorganic Chemistry II: Synthesis, Structure, and Reactivity of Coordination Compounds, and Bioinorganic Chemistry

Spring. 4 credits. Lecs, M W F 10:10. Not offered 2001–2002; next offered fall 2002. P. T. Wolczanski.

Synthesis, structure, and reactivity of modern coordination compounds; oxidation and bioinorganic chemistry. Emphasis on bonding models, structure, and reactivity, including the elucidation of mechanisms. Readings at the level of Purcell and Kotz's *Inorganic Chemistry*, and Jordan's *Reaction Mechanisms of Inorganic and Organometallic Systems.*]

CHEM 607 Advanced Inorganic Chemistry III: Solid-State Chemistry

Spring. 4 credits. Prerequisite: CHEM 605 or permission of instructor. Lecs, M W F 11:15. S. Lee.

The third in a three-term sequence. Interdisciplinary approach to solids. Topics include solid-state structure and X-ray diffraction, synthesis methods, defects in solids, phase diagrams, electronic structure, and chemical and physical properties of solids. Text: *Solid State Chemistry and Its Applications*, by West. Readings from inorganic chemistry and solid-state physics texts.

CHEM 608 Organometallic Chemistry

Spring. 4 credits. M W F 10:10. P. T. Wolczanski.

Synthesis, structure, and reactivity of organotransition metal complexes. Current literature is emphasized, and background readings are at the level of Collman, Hefedus, Finke, and Norton's *Principles and Applications of Organotransition Metal Chemistry.*

[CHEM 622 Chemical Communication

Fall. 3 credits. Lecs, M W F 10:10. Not offered 2001–2002; next offered fall 2002. J. Meinwald, T. Eisner.

For description, see BIONB 623.]

CHEM 625 Advanced Analytical Chemistry I

Spring. 4 credits. Prerequisite: CHEM 288 or 390 or equivalent. Lecs, M W F 9:05; occasional prelims W 7:30 P.M. D. B. Zax.

The application of molecular spectroscopy to chemical problems. Topics in infrared, NMR, and mass spectroscopy are discussed.

[CHEM 627 Advanced Analytical Chemistry II

Spring. 3 credits. Primarily for graduate students. Prerequisite: CHEM 793 or equivalent is preferable. Lecs, M W F 9:05–9:55. Not offered 2001–2002; next offered spring 2003. D. B. Zax.

Modern techniques in nuclear magnetic resonance. Little overlap is expected with CHEM 625, as this course focuses on more general questions of experimental design, understanding of multipulse experiments, and aspects of coherent averaging theory. Examples taken from both liquid and solid-state NMR. May also be of interest to other coherent spectroscopies.]

CHEM 628 Isotopic and Trace Element Analysis (also NS 690)

Spring. 3 credits. Primarily for graduate students and advanced undergraduates. Prerequisite: CHEM 288 or 390 or 302, or CHEM 208 and PHYS 208, or permission of instructor. Lecs T R 10:10. Offered alternate years. J. T. Brenna.

Survey course in modern high precision isotope ratio mass spectrometry (IRMS) techniques and trace/surface methods of analysis. Topics include dual inlet and continuous flow IRMS, thermal ionization MS, inductively coupled plasma MS, atomic spectroscopy, ion and electron microscopies, X-ray and electron spectroscopies, and biological and solid state applications.

CHEM 629 Electrochemistry

Fall. 4 credits. Primarily for graduate students and junior and senior undergraduates. Prerequisite: CHEM 390 or equivalent (MATH 213 helpful). Lecs, T R 8:40–9:55. H. D. Abruña.

Fundamentals and applications of electrochemistry. Topics include the fundamentals of electrode kinetics, electron transfer theory, the electrical double layer, diffusion, and other modes of transport. A wide range of techniques and their application as well as instrumental aspects are covered.

CHEM 665 Advanced Organic Chemistry

Fall. 4 credits. Primarily for graduate students and junior and senior undergraduates. Prerequisites: CHEM 358 or 360, and 390 or equivalents or permission of instructor. Lecs, M W F 9:05. D. T. McQuade.

CHEM 665 focuses on bonding (covalent and non-covalent), reaction mechanisms, and reactive intermediates, with an emphasis on experimental design and methods. The lecture portion of the course is augmented by both written and oral presentations from the students.

CHEM 666 Synthetic Organic Chemistry

Spring. 4 credits. Primarily for graduate students and upperclass undergraduates. Prerequisite: CHEM 665 or permission of instructor. Lecs, T R 10:10–11:25. D. B. Collum.

Modern techniques of organic synthesis; applications of organic reaction mechanisms and retrosynthetic analysis to the problems encountered in rational multistep synthesis, with particular emphasis on modern developments in synthesis design.

CHEM 668 Chemical Aspects of Biological Processes

Fall. 4 credits. Prerequisite: CHEM 360 or equivalent. Lecs, T R 8:40–9:55. T. P. Begley.

A representative selection of the most important classes of enzyme-catalyzed reactions is examined from a mechanistic perspective. Topics discussed include the chemical basis of enzymatic catalysis, techniques for the elucidation of enzyme mechanism, cofactor chemistry, and the biosynthesis of selected natural products. The application of chemical principles to understanding biological processes is emphasized.

CHEM 670 Fundamental Principles of Polymer Chemistry

Fall. 4 credits. Prerequisite: Physical Chemistry 389/390 and Organic Chemistry 359/360 or equivalent or by permission of instructor. Primarily for graduate students and advanced undergraduates. No previous knowledge of polymers is required. Lecs, T R 10:00–11:15. D. Y. Sogah.

This course emphasizes general concepts and fundamental principles of polymer chemistry. The first part of the course deals with general introduction to classes of polymers, molar masses and their distributions, and a brief survey of major methods of polymer synthesis—radical, step growth, ionic, group transfer, Ziegler-Natta, and metathesis polymerization methods—with emphasis on kinetics, mechanisms and stero chemistry rather than on structure. The second part deals with characterization and physical properties. These include: solution properties—solubility and solubility parameters, solution viscosity, molecular weight characterizations [gel permeation chromatography, viscometry, light scattering, osmometry]; bulk properties—thermal and mechanical properties; and structure-property relationships. The discussions will focus on chemistry rather and physics than engineering of polymers.

CHEM 671 Synthetic Polymer Chemistry (also MS&E 671 and CHEME 675)

Spring. 4 credits. Prerequisites: a minimum of organic chemistry at the level of CHEM 359/360 is essential. Those without this organic chemistry background should see the instructor before registering for the course. Primarily for graduate students and advanced undergraduates. No previous knowledge of polymer chemistry is required although knowledge of material covered in CHEM 670 or MS&E 452 will be helpful. Lecs, T R 8:30–10:00. D. Y. Sogah.

This course emphasizes application of organic synthetic methods to the development of new polymerization methods and control of polymer architecture. Emphasis is on modern concepts in synthetic polymer chemistry and topics of current interest: the study of new methods of synthesis, preparation of polymers with reactive end groups, the control of polymer stereochemistry and topology, and the design of polymers tailored for specific uses and properties. Topics on synthesis are selected from the following: step-growth polymerization with emphasis on high performances materials, free radical polymerization and copolymerization, Ziegler-Natta polymerization, recent developments in living free radical, anionic, cationic, group transfer, and ring-opening metathesis polymerizations.

[CHEM 672 Kinetics and Regulation of Enzyme Systems

Spring. 4 credits. Primarily for graduate students with interests in biophysical chemistry. Prerequisite: CHEM 288 or 390, BIOBN 331, or equivalents or permission of instructor. Lecs, M W F 10:10. Not offered 2001–2002. B. Baird.

Focus is on protein interactions with ligands and consequent changes in structure and activity. Topics include protein structure and dynamics; thermodynamics and kinetics of ligand binding; steady state and transient enzyme kinetics; enzyme catalysis and regulation; and the role of cell membrane receptors in regulating cellular activities.]

CHEM 677 Chemistry of Nucleic Acids

Fall. 4 credits. Primarily for graduate students. Prerequisites: CHEM 358 or 360, and 390 or equivalents. Lecs, M W 10:10–11:00. D. A. Usher.

Structure, properties, synthesis, and reactions of nucleic acids from a chemical point of view. Special topics include antisense and antigene technology, ribozyme reactions (including the ribosome), mutagens, PCR, recent advances in sequencing, DNA as a computer, and alternative genetic materials.

CHEM 678 Statistical Thermodynamics
Fall. 4 credits. Primarily for graduate students. Prerequisite: CHEM 390 or equivalent. Lecs, M W F 9:05. J. Marohn.
Course covers the principles of statistical thermodynamics and how they lead to classical thermodynamics. Topics include: ensembles and partition functions; ideal gases and crystals; thermodynamic properties from spectroscopic and structural data; chemical equilibrium; dense gases: virial coefficients; statistical mechanics of solutions, and Bose-Einstein and Fermi-Dirac statistics. At the level of the first twelve chapters of *Statistical Mechanics* by McQuarrie.

CHEM 681 Introduction to Quantum Chemistry
Fall. 4 credits. Prerequisites: 1 year of undergraduate physical chemistry, 3 semesters of calculus, 1 year of college physics. Lecs T R 10:10–11:25. G. S. Ezra.
An introduction to the application of quantum mechanics in chemistry. This course covers many of the topics in CHEM 793–794 at a more descriptive, less mathematical level. The course is designed for advanced undergraduates, chemistry graduate students with a minor in physical chemistry, and graduate students from related fields with an interest in physical chemistry. At the level of *Quantum Chemistry*, by Levine, or *Molecular Quantum Mechanics* by Atkins.

CHEM 686 Physical Chemistry of Proteins
Fall. 4 credits. Primarily for graduate students. Prerequisite: CHEM 288 or 390 or equivalents. Letter grade for undergraduate and graduates. Lecs, M W F 12:20. B. Crane.
Physical properties of proteins are presented from a quantitative perspective and related to biological function. Topics include: chemical, structural, thermodynamic, hydrodynamic, electrical and conductive properties of soluble and membrane proteins; conformational transitions, protein stability and folding; photochemistry and spectroscopic properties of proteins; and protein-protein interactions and single molecular studies.

CHEM 700 Baker Lectures
Fall, on dates TBA. No credit. Lec, T R 11:15.
Distinguished scientists who have made significant contributions to chemistry present lectures for approximately six weeks. This year's lecturer: Jean M. J. Frechet, University of California at Berkley.

CHEM 701 Introductory Graduate Seminar
Fall. No credit. Highly recommended for all senior graduate students, in any field of chemistry. Lecs W 8:00–9:00 P.M. R. Hoffmann.
A discussion of professional issues facing young chemists as well as life skills: academic and industrial trends, presentations, employment, immigration, publication, research funding, and ethics.

CHEM 716 Introduction to Solid State Organic Chemistry
Fall. 3 credits. Prerequisite: some exposure to (or a course in) quantum mechanics. A good undergraduate physical chemistry course may be sufficient, while PHYS 443 or CHEM 793 or CHEM 794 are at a substantially higher level than what is needed. Lecs, M W F 12:20. S. Lee.
This course examines first the principles of crystallography. We then consider properties such as conduction, superconductivity, ferroelectricity and ferromagnetism. The final portion of this course is concerned with structure-property relations.

[CHEM 765 Physical Organic Chemistry I
Fall. 4 credits. Primarily for graduate students. Prerequisite: CHEM 665 or permission of instructor. Lecs, M W F 10:10. Not offered 2001–2002. C. F. Wilcox.
Application of computational and experimental techniques to studies of organic reaction mechanisms and the properties of reactive intermediates.]

CHEM 774 Chemistry of Natural Products: Combinatorial Chemistry
Spring. 3 credits. Prerequisites: CHEM 360 and BIOBM 330 or equivalent. Lec, M W F 10:10–11:30. T. P. Begley.
Combinatorial chemistry has revolutionized the way organic chemists think about structure function studies on biological systems and the design of inhibitors. This course explores the design, synthesis, screening, and use of natural (i.e., peptide, protein, nucleic acid, carbohydrate) and unnatural (i.e., totally synthetic) libraries.

CHEM 780 Chemical Kinetics and Molecular Reaction Dynamics
Fall. 4 credits. Prerequisite: CHEM 681 or permission of instructor. Lecs, T R 10:10–11:25. P. L. Houston.
Principles and theories of chemical kinetics and molecular reaction dynamics. Topics include potential energy surfaces, transition state theory, and statistical theories of unimolecular decomposition. Depending on class interest, the course also includes special topics such as surface reactions and photochemistry.

CHEM 787 Modern Methods of Physical Chemistry
Fall. 4 credits. Prerequisites: 1 year of undergraduate physical chemistry, 3 semesters of calculus, 1 year of college physics, (same as for CHEM 681). Lecs, T R 10:10. J. H. Freed.
This course provides the methodological background for graduate courses in chemical thermodynamics, kinetics, statistical mechanics, and quantum chemistry. It includes the methods of solution of relevant differential equations; the eigenvalue problem and linear algebra; special functions partial differential equations for diffusion and wave mechanics; integral transforms; functions of a complex variable. At the level of *Mathematical Methods in the Physical Sciences, 2nd Edition*, by Boas. There is a midterm and a final exam, and 12 problem sets.

CHEM 788 Macromolecular Crystallography (also BIOBM 738)
Spring. 3 credits. S-U grades optional. Prerequisite: permission of instructor. Offered alternate years. Lecs, T R 10:10. S. E. Ealick.
Lectures briefly cover the fundamentals of crystallography and focus on methods for determining the three-dimensional strucures of macromolecules. These include crystallization, data collection, phasing methods, model building, refinement, structure validation and structure interpretation.

[CHEM 791 Spectroscopy
Spring. 4 credits. Prerequisite: CHEM 793 or PHYS 443 or equivalent. Lecs, M W F 11:15–12:05. Not offered 2001–2002. G. S. Ezra.
Principles of molecular rotational, vibrational, and electronic spectroscopy. Topics include interaction of molecules with radiation; Born-Oppenheimer approximation; diatomic molecules; polyatomic molecules; feasible operations and the molecular symmetry group; and spectroscopy, dynamics, and IVR. At the level of Kroto's *Molecular Rotation Spectra*.]

[CHEM 792 Molecular Collision Theory
Spring. 4 credits. Lecs, T R 10:10–11:25. Not offered 2001–2002. G. S. Ezra.
The concepts and methods of scattering theory are described with particular emphasis on applications to problems of chemical interest. At the level of Child's *Molecular Collision Theory* and Taylor's *Scattering Theory*.]

CHEM 793 Quantum Mechanics I
Fall. 4 credits. Prerequisites: CHEM 390, coregistration in A&EP 321 or equivalents or permission of instructor. Lecs, M W F 11:15. D. B. Zax.
Course topics include: Schrodinger's equation, wave packets, uncertainty principle, WKB theory, matrix mechanics, orbital and spin angular momentum, exclusion principle, perturbation theory, and the variational principle. At the level of Cohen-Tannoudji's *Quantum Mechanics*.

CHEM 794 Quantum Mechanics II
Spring. 4 credits. Prerequisites: CHEM 793 or equivalent and the equivalent of or coregistration in A&EP 322, or permission of instructor. Lecs, T R 10:10. B. Widom.
Course topics include: WKB theory; potential curves and surfaces; light/matter interaction and spectroscopy; scattering theory; Hartree-Fock and density-functional theories of electronic structure; molecular-orbital theory; and band theory of solids.

CHEM 796 Statistical Mechanics
Spring. 4 credits. Prerequisite: CHEM 678 and 793 or equivalent. Lecs, T R 8:30–9:55. R. F. Loring.
Statistical mechanics of systems of interacting molecules. Structure and thermodynamics of molecular liquids. Phase transitions and critical phenomena. Computer simulation methods Nonequilibrium statistical mechanics, with application to reactive and nonreactive dynamics in the liquid state.

[CHEM 798 Special Topics in Physical Chemistry (Chemical Bonding in Polymers, Surfaces, and the Solid State)
Spring. 4 credits. Prerequisite: CHEM 605, or 681, or 793, or PHYS 443, or the equivalent. Lecs, T R 10:10–11:25. Not offered 2001–2002. R. Hoffmann.
The qualitative aspects of the electronic structure and chemical bonding on extended one-, two-, and three-dimensional systems are discussed, in a way accessible to a wide range of inorganic and organic chemists, and to engineers and physicists as well.]

CHINESE

FALCON Program (Chinese)

See Department of Asian Studies.

CLASSICS

H. Pelliccia (chair), L. S. Abel, F. M. Ahl, C. Brittain (director of undergraduate studies), K. Clinton, J. E. Coleman, G. Fine, J. R. Ginsburg, E. Hohendahl, G. Holst-Warhaft, T. Irwin, G. M. Kirkwood (emeritus), H. Kolias, D. Mankin, G. M. Messing (emeritus), A. Nussbaum, P. Pucci, H. R. Rawlings III, J. L. Rife, J. Rusten, D. R. Shanzer, (director of graduate studies), B. Strauss

Cornell University has long recognized the importance of studying the civilizations of ancient Greece and Rome. Particularly in an age of increasing specialization, study of the Classics is widely viewed as an excellent means of acquiring a liberal education; at Cornell, we are deeply interested in the continuing humanistic values contained in the literature of the ancient world and in gaining a fuller understanding of these important cultures and their imprint on subsequent ages.

The Department of Classics at Cornell is one of the oldest and largest in the country. With 14 full-time faculty members, together with professors of related interests in the Departments of History, Philosophy, Comparative Literature, History of Art, Modern Languages, Linguistics, and Near Eastern Studies and in the Archaeology, Medieval Studies, and Religious Studies programs, the range of instruction available is very large, including not only the traditional study of language, literature, and ancient history, but also newer developments in the field, such as comparative study of Mediterranean civilizations and modern literary theory.

Although Classics, like other areas of humanistic study, does not aim at providing specific preprofessional training, over the years Classics majors from Cornell have gone on to a wide variety of careers in law, education, medicine, diplomacy, management, educational administration, government, and many others.

The department offers courses in Bronze Age and Classical archaeology and is active in field projects in Classical lands. It sponsors archaeological excavations at Halai in Greece, which serves as a field training school for Cornell undergraduate and graduate students. On campus there are also collections of ancient artifacts, reproductions of ancient sculpture, and one of the few laboratories in the world to concentrate on the tree-ring dating of ancient monuments from Greece, Cyprus, and Turkey. The archaeology courses may be used to satisfy some of the requirements for the Intercollege Program in Archaeology or for the major in Classical Civilization. They require no knowledge of either Greek or Latin. Similarly, the department offers a variety of courses and seminars in English on such subjects as Greek mythology, Greek and Roman mystery religions, early Christianity, and Greek and Roman society, as well as ancient epic, tragedy, history, and philosophy. For those whose interest in things Greek and Roman extends no further than a desire to understand the English language a little better, the department offers one course in the Greek and Latin elements that make up a huge proportion of the vocabulary of Modern English, and another that deals more specifically with the Greek and Latin ingredients of bioscientific vocabulary. Programs in Greek and Latin at the elementary level are also offered. For the more ambitious there are courses involving reading, in the original, of Greek and Latin authors from Homer to St. Augustine and Bede and, periodically, the Latin works of Dante, Petrarch, and Milton. Sanskrit, the classical language of ancient India, is also offered, along with courses in translation on Indic religion, myth, and literature. The department makes every attempt to adapt its program to the needs of each student. If there is a Classical writer you would like to study, the department will do its best to help you do so whether you are a major in the department or not.

Majors

The Department of Classics offers majors in Classics, Greek, Latin, and Classical Civilization.

Classics

The Classics major comprises seven courses in advanced Greek and Latin (numbered 201 or above) and three courses in related subjects (see below) selected in consultation with the adviser. Classics majors are required to take a minimum of one 300-level course in one language and two 300-level courses in the other.

Students who are considering the option of undertaking graduate study in Classics are strongly advised to complete the Classics major.

Greek

The Greek major comprises CLASS 201 plus five advanced courses in Greek (numbered 203 and above) of which at least three are to be taken at the 300-level, and three courses in related subjects (see below) selected in consultation with the adviser.

Latin

The Latin major comprises CLASS 205 plus five advanced courses in Latin (numbered 207 and above) of which at least three are to be taken at the 300-level, and three courses in related subjects (see below) selected in consultation with the adviser.

Classical Civilization

Those who major in Classical Civilization must complete (a) qualification in Latin and Greek or proficiency in either; (b) CLASS 211 (or HIST 265), CLASS 212 (or HIST 268), and CLASS 220, plus five courses selected from those listed under Classical civilization, Classical archaeology, Ancient Philosophy, Latin, and Greek; and (c) three courses in related subjects (see below) selected in consultation with the adviser.

Related Subjects

The field or scope of the subject "Classics" is the interdisciplinary study of Greek and Roman antiquity, comprising Greek and Latin language, literature, and linguistics; ancient philosophy; history; archaeology and art history; papyrology; epigraphy; and numismatics. It covers the ancient Mediterranean and neighboring lands as they were during the period extending from approximately 3000 B.C.E. to the sixth century C.E. In addition to the required courses in language and literature, the major includes related courses intended to give breadth and exposure to the other disciplines within the field and to enrich the student's study of the original languages. Since the influence of the Greco-Roman world extended far beyond antiquity, a related course could well focus on some aspect of the classical tradition in a later period. Students select related courses in consultation with their advisers or the DUS.

Honors

Candidates for the degree of Bachelor of Arts with honors in Classics, Greek, Latin, or Classical civilization must fulfill the requirements of the appropriate major study as given above and must also successfully complete the special honors course 472. Credit for the honors course may be included in the credits required for the major. Students who wish to become candidates for honors must have a cumulative average of B, and B+ in the major. In consultation with the Standing Committee on Honors, the students should choose an honors adviser by the end of their sixth semester. By the second week of their seventh semester they should submit an outline of their proposed honors work to the Standing Committee and to the adviser(s). The thesis will be written under the supervision of the honors adviser(s) chosen by the student. Honors advisers will submit recommendations to the Standing Committee on Honors. The Committee will read all honors theses and will determine the level of departmental honors. A copy of each successful honors thesis will be filed with the department.

Independent Study

Independent study at the 300 level may be undertaken by undergraduates upon completion of one semester of work at the 300 level. 200-level independent study may be undertaken only in the case of documented schedule conflict upon application to the DUS.

Study Abroad

Cornell participates in the Intercollegiate Center for Classical Studies in Rome, which offers courses in Latin, Greek, ancient history, art, archaeology, and Italian. Another opportunity for a semester's study abroad is available through College Year in Athens. (Consult Cornell Abroad for details.) In addition, Cornell is a member institution of the American School of Classical Studies at Athens, whose Summer Program is open to graduate students and qualified undergraduates. The American Academy in Rome, of which Cornell is also a member institution, offers full-year and summer programs for qualified graduate students. For graduate students the Department of Classics offers a few travel grants each year from the Townsend Memorial Fund. Detailed information on these programs is available in the Department of Classics Office, 120 Goldwin Smith Hall.

Summer Support for Language Study

The Beatrice R. Kanders Memorial Scholarship (for the summer immediately following the freshman or sophomore year; preference given to dyslexic students) is available to students who want to enroll in Intensive Latin or Greek in the Cornell summer session. These courses are designed to enable students to enter second-year Latin or Greek the following fall. Preference is given to Classics undergraduate majors, and other students needing Latin or Greek for completion of their majors. Applications are due to the chair of the Department of Classics by March 16.

Placement in Latin, Ancient Greek, and Modern Greek

Placement of first-year students in Latin and ancient Greek courses, and proficiency level in modern Greek, is determined by an examination given by the Department of Classics during orientation week or by arrangement with the director of undergraduate studies.

First-Year Writing Seminars

The department offers freshman writing seminars on a variety of topics. Consult John S. Knight Institute brochure for times, instructors, and descriptions.

Classical Civilization

CLASS 100 Word Power: Greek and Latin Elements in the English Language
Spring. 3 credits. E. Hohendahl.
This course gives the student with no knowledge of the classical languages an understanding of how the Greek and Latin elements that make up over half our English vocabulary operate in both literary and scientific English usage. Attention is paid to how words acquire their meaning and to enlarging each student's working knowledge of vocabulary and grammar.

CLASS 109 English Words: Histories and Mysteries (also LING 109) # (III)
Fall. 3 credits. M. Weiss.
For description, see LING 109.

CLASS 211 The Greek Experience # (IV)
Fall. 3 credits. Limited to 50 students. F. Ahl.
An introduction to the literature and thought of ancient Greece. Topics include epic and lyric poetry, tragedy and comedy, and historical, political, philosophical, and scientific writings. Some attention is also given to the daily life of ordinary citizens, supplemented by slides of ancient art and architecture.

[CLASS 212 The Roman Experience # (IV)
Spring. 3 credits. Not offered 2001–2002; next offered 2002–2003. Staff.
An introduction to the civilization of the Romans as expressed in their literature, religion, and social and political institutions.]

CLASS 217 Initiation to Greek Culture # (IV)
Fall. 4 credits. Limited to 18 students. This course is intended especially for freshmen (a few exceptionally motivated sophomores or upperclass students may be accepted). Apply in writing to the Chair, Department of Classics, 120 Goldwin Smith Hall. P. Pucci and L. Abel.
Knowledge of Greek or Latin is not necessary, since all texts are in translation. What is necessary is the willingness to participate in three one-hour seminars each week and also a supplementary one- or two-hour session, during which the class participates in workshops with specially invited guests.

This course covers a wide range of Greek literary and philosophical works, as well as modern critical and philosophical writings on the Greeks. Our focus throughout is on the status of language, the many forms of discourse that appear in the literature, and the attempts the Greeks themselves made to overcome the perceived inadequacies and difficulties inherent in language as the medium of poetry and philosophy.

We inquire into the development of philosophy in the context of a culture infused with traditional, mythological accounts of the cosmos. We ask how poetic forms such as tragedy responded to and made an accommodation with philosophical discourse while creating a most emotional effect on the audience; how the first historians, using literary and philosophical discourse, created space for their own inquiry; and we discuss how these issues persist and are formulated in our own thinking.

[CLASS 218 Initiation to the Classical Tradition # (IV)
Spring. 4 credits. See CLASS 217 front matter. Not offered 2001–2002.]

CLASS 222 Ancient Fiction (also COM L 222) # (IV)
Fall. 3 credits. All readings are in English. J. Rife.
Ancient fiction blended ideal romance, fantastic adventure, and social realism into new literary forms that would have a lasting impact on the medieval and modern imagination, from early Christian and Renaissance literature to opera and film. This course surveys major works of fiction by Greek and Roman authors in translation, including the novels by Achilles Tatius, Apuleius, Chariton, Heliodorus, Longus, and Petronius and a selection of shorter pieces from related genres such as satire, biography, and travel accounts. Lecture and discussion address the development of several defining features: the central themes of love and death, the design and involution of narrative structure, the play of intertextuality, the drawing of imaginary landscapes, the portrayal of ethnic and social identity, and the labile classification of truth, or historicity, and falsehood, or fictionality. Students also evaluate several theoretical approaches to the interpretation of ancient fiction and consider the influence of the ancient novels on their successors.

CLASS 223 The Comic Theater (also COM L 223 and THETR 223) # (IV)
Summer 2002. 3 credits. J. Rusten.
The origins of comic drama in ancient Greece and Rome, and its subsequent incarnations especially in the Italian renaissance (*Commedia erudita* and *Commedia dell'arte*), Elizabethan England, seventeenth-century France, the English Restoration, and Hollywood in the thirties and forties. Chief topics include: the growth of the comic theatrical tradition and conventions; techniques and themes of comic plots (trickster, parody, farce, caricature); and the role of comedy in society. All readings in English.

[CLASS 229 War and Peace in Greece and Rome (also HIST 228) # (III)
Fall. 4 credits. Not offered 2001–2002. B. Strauss.
For description, see HIST 228.]

CLASS 231 Ancient Philosophy (also PHIL 211) # (IV)
Fall. 4 credits. C. Brittain.
For description, see PHIL 211.

CLASS 234 Seminar: Eyewitness to War in the Ancient World (also HIST 232) # (III)
Spring. 3 credits. B. Strauss.
A study of ancient soldier-historians who participated in the campaigns about which they later wrote. Topics include historicity, autobiography, propaganda, prose style. Readings include selections from Thucydides, Xenophon, Julius Caesar, Josephus, Ammianus Marcellinus as well as, for comparative purposes, modern soldier-historians.

CLASS 236 Greek Mythology (also COM L 236) # (IV)
Fall 2001 and summer 2002. 3 credits. Limited to 200 students. D. Mankin.
A survey of the Greek myths, with emphasis on the content and significance of the myths in Mediterranean society, including the place of myth in Greek life and consciousness; the factors and influences involved in the creation of myths; and the use of myths for our understanding of Greek literature, religion, and moral and political concepts.

[CLASS 237 Greek Religion and Mystery Cults (also RELST 237) # (IV)
Spring. 3 credits. Not offered 2001–2002. K. Clinton.
Greek religion constitutes one of the essential features of ancient Greek civilization and distinguishes it from later Western civilization. Since religion permeates Greek culture, including the major art forms (epic poetry, tragedy, comedy, architecture, painting, and sculpture), the course investigates the interaction of religion with these forms—an investigation that is fruitful both for the understanding of Greek religion and the forms themselves, some of which, like tragedy, originated in cult. A representative variety of cults and their history are studied with special emphasis on mystery cults, such as the Eleusinian mysteries of Demeter and Persephone, the Kabiroi, the Great Gods of Samothrace, and Bacchic rites.]

[CLASS 238 The Ancient Epic and Beyond # (IV)
3 credits. Not offered 2001–2002. H. Pelliccia.
We move, Odysseus-like, to the West: beginning with Homer's *Iliad* (and including the British poet Christopher Logue's "account" of the opening books) and *Odyssey*, we continue in the Hellenistic and Augustan eras with Apollonius of Rhodes' *Argonautica* and Virgil's *Aeneid*. A violent shift in space and time has us conclude with two New World maritime epics: Herman Melville's *Moby Dick* and Derek Walcott's *Omeros*.]

CLASS 258 Periclean Athens # (IV)
Spring. 4 credits. H. Pelliccia, H. R. Rawlings III, and J. Rusten.
The first five weeks provide a synoptic view of Athens' historical and cultural achievement in the middle of the fifth century B.C.—the traditional pinnacle of "The Glory that was Greece." Readings are taken from Greek historians, philosophers, poets, and documentary texts. At least two of the (75-minute) lectures are devoted to art history and delivered by a guest speaker. The next 7–8 weeks follow the course of the Peloponnesian War to its end; readings from Thucydides are interwoven with contemporaneous texts composed by the dramatists (Sophocles, Euripides, and Aristophanes) and the sophists (supplemented with readings from Plato). The remaining classes consider the fate of Socrates and a few other fourth-century developments. The basic aim of the course is to approach an understanding of how and why a vital and creative society came unglued. There are weekly discussion sections.

CLASS 260 Conceptions of the Self in Classical Antiquity # (IV)
Spring. 4 credits. There are no prerequisites for this course; all readings are in English. C. Brittain.
The idea of a person or a 'self' seems to be something determined by nature: we each have one mind, a unique personality, and the capacity to act as moral agents. But the way in which we conceive of ourselves also depends on our beliefs about human nature, rationality, freedom, luck, and society. This course examines a variety of very different conceptions of the self from the period 700 BCE to 400 CE, using a range of texts from Greek and Roman literature (including epic and tragedy), medical theory, and philosophy (both pagan and Christian).

CLASS 265 Ancient Greece from Homer to Alexander the Great (also HIST 265) # (III)
4 credits. Open to freshmen. B. Strauss.
For description, see HIST 265.

[CLASS 268 A History of Rome from Republic to Principate (also HIST 268) # (III)
Spring. 4 credits. Open to freshmen. Not offered 2001–2002. J. Ginsburg.
For description, see HIST 268.]

[CLASS 291 Classical Indian Narrative (also ASIAN 291) @ # (IV)
Spring. 3 credits. Not offered 2001–2002. C. Minkowski.]

CLASS 303–304 Independent Study in Classical Civilization, Undergraduate Level
303, fall; 304, spring. Up to 4 credits.

CLASS 324 Translation for the Theatre (also THETR 423/623 and COM L 446/646) # (IV)
Spring. 4 credits. Prerequisites: proficiency in language other then English; coursework in dramatic literature, directing, or playwriting. J. E. Gainor.
For description, see THETR 423/623.

CLASS 331 Goths, Vandals, Franks, and Romans # (IV)
Fall. 4 credits. D. Shanzer.
Contemporary views of the Visigothic Sack of Rome by Alaric in 410 are followed by three different case-studies for co-existence of Roman and barbarian in Late Antiquity: the Vandal kingdom (North Africa), the Ostrogothic kingdom (Italy), and finally the one that lasted, the Frankish kingdom (Gaul). Readings include contemporary primary works as well as modern historiography.

CLASS 333 Greek and Roman Mystery Cults and Early Christianity (also RELST 333) # (IV)
Fall. 4 credits. A previous course in Classics (civilization or language) or Religious Studies 101 is recommended. K. Clinton.
A study of the controversial question of religious continuity between paganism and early Christianity. After a brief survey of classical mystery cults and Hellenistic religion, the course focuses on such Hellenistic and Roman cults as the mystery cults of Isis, Bacchus, Mithras, and Attis and the Great Mother and on the distinctive features that contributed to their success. Discussion of Christian liturgy and beliefs to determine what Christianity owed to its pagan predecessors and to isolate the factors that contributed to its triumph over the "rival" pagan cults of late antiquity.

CLASS 339 Plato (also PHIL 309) # (IV)
Fall. 4 credits. Prerequisite: at least 1 previous course in philosophy. G. Fine.
For description, see PHIL 309.

[CLASS 345 The Tragic Theater (also COM L 344 and THETR 345) # (IV)
Spring. 4 credits. Limited to 40 students. Not offered 2001–2002. F. Ahl.
Tragedy and its audiences from ancient Greece to modern theater and film. Topics: origins of theatrical conventions; Shakespeare and Seneca; tragedy in modern theater and film. Works studied will include: Aeschylus' *Agamemnon*; Sophocles' *Oedipus Tyrannus*, *Philoctetes*; Euripides' *Alcestis*, *Helen*, *Iphigeneia in Aulis*, *Orestes*; Seneca's *Thyestes*, *Trojan Women*; Shakespeare's *Julius Caesar*, *Titus Andronicus*, *Othello*; Strindberg's *The Father*; Dürrenmatt's *The Visit*; Bergman's *Seventh Seal*; Cacoyannis' *Iphigeneia*.]

CLASS 382 Greeks, Romans, and Victorians (also COM L 382) # (IV)
Spring. 4 credits. F. Ahl.
This course explores how nineteenth-century (and especially Victorian English and Irish) poets, dramatists, and to a lesser extent, novelists, present Greco-Roman antiquity. The varied influences of Vergil and Homer, Seneca and Sophocles, Plautus and Aristophanes, Horace, and Greek lyric poetry are discussed in selected works of Thomas More, Shelley, Byron, Swinburne, W. S. Gilbert, Oscar Wilde, and the pre-Raphaelites and Victorian poets.

[CLASS 390 The Sanskrit Epics (also ASIAN 390) @ # (IV)
4 credits. Not offered 2001–2002. C. Minkowski.
For description, see ASIAN 390.]

[CLASS 395 Classical Indian Philosophical Systems (also ASIAN 395 and RELST 395) @ # (IV)
Spring. 4 credits. Prerequisite: some background in philosophy or in classical Indian culture. Not offered 2001–2002. C. Minkowski.
For description, see ASIAN 395.]

CLASS 445 Classic Modern Historiography of Ancient Greece (also HIST 435) (III)
Fall. 4 credits. Prerequisite: an introductory course in ancient Greek history or civilization or permission of the instructor. B. Strauss.
This upper-level seminar is an introduction to some of the main themes, directions, and controversies in modern research on ancient Greece. We read selections from the leading works of scholarship on ancient Greece from the nineteenth and twentieth century, including such authors as Grote, Burckhardt, Cornford, Glotz, Momigliano, M. I. Finley, Ste. Croix, Vernant, Vidal-Naquet, and the current crop of scholars.

[CLASS 450 The Peloponnesian War (also CLASS 632 and HIST 450/630) # (III)
Fall. 4 credits. Prerequisites: CLASS 211 or 217, HIST 265, or permission of instructor. Not offered 2001–2002. B. Strauss.
For description, see HIST 450.]

[CLASS 463 Gender and Politics in the Roman World (also HIST 463 and WOMNS 464) # (III or IV)
Spring. 4 credits. Not offered 2001–2002. J. Ginsburg.
An undergraduate seminar examining the relationship between gender and politics in the late Roman Republic and early Empire. Among the questions this course addresses are: was politics the exclusive domain of men in Roman society (as is generally assumed) or does a broader definition of politics and an understanding of the various forms political activity in ancient Rome might have taken allow a place for women in Roman political life? What role did gender have in Roman political discourse and ideology? Why did issues such as family, marriage, and sexuality become subjects of political debate and legislation?]

[CLASS 469 Equality and Inequality in Ancient Greece (also HIST 469) # (III) or IV
Fall. 4 credits. Prerequisite: HIST 265, CLASS 211 or 217, or written permission of the instructor. Not offered 2001–2002. B. Strauss.
For description, see HIST 469.]

CLASS 480 Roman Society and Politics under the Julio-Claudians (also HIST 473) # (III or IV)
Spring. 4 credits. Prerequisite: CLASS 212, HIST 268, or permission of instructor. J. Ginsburg.
This course examines several of the important social and political changes in Roman society under Augustus and his successors, the Julio-Claudians. Topics to be investigated include Augustus's consolidation of power through political and social revolution, the Augustan attempt to regulate family life and social relations by legislation, the relation of the emperor Tiberius with the members of the old ruling class, the growth of the imperial bureaucracy and the new opportunities for social mobility, the political opposition to Claudius and Nero, Nero's cultural and provincial policy, and the manipulation of the imperial cult. All readings will be in English.

CLASS 711–712 Independent Study for Graduate Students in Classical Civilization
711, fall; 712, spring. Up to 4 credits.

Greek

CLASS 101 Greek for Beginners
Fall. 4 credits. A. Nussbaum.
Introduction to Attic Greek. Designed to enable the student to read the ancient authors as soon as possible.

CLASS 103 Attic Greek
Spring. 4 credits. *Provides language qualification.* Prerequisite: 101 or equivalent. K. Clinton.
A continuation of CLASS 101, prepares students for CLASS 201.

CLASS 104 Intensive Greek
Summer. 6 credits. *Provides language qualification.* Staff.
An intensive introduction combining the fundamentals of ancient Greek grammar with readings from a variety of classical authors in the original Greek. Prepares students in a single semester for CLASS 201.

CLASS 201 Attic Authors # (IV)
Fall. 3 credits. Prerequisite: CLASS 103 or 104 or equivalent. C. Brittain.
Selected readings from Greek prose.

[CLASS 203 Homer # (IV)
Spring. 3 credits. Prerequisite: CLASS 201. Not offered 2001–2002.
Readings in the Homeric epic with emphasis on formulaic style.]

[CLASS 210 Attic Prose # (IV)
3 credits. Prerequisite: CLASS 201. Not offered 2001–2002.]

CLASS 225–226 Independent Study in Greek, Undergraduate Level
225, fall; 226, spring. Up to 4 credits. Only by permission of the DUS in the case of documented schedule conflict.

[CLASS 305 The Greek New Testament and Early Christian Literature # (IV)
Fall. 4 credits. Prerequisite: CLASS 201 or equivalent, or permission of instructor. Not offered 2001–2002. D. Shanzer.
More advanced readings from the *Acts of the Apostles* and some exercises on the *Gospels* are followed by readings from Early Christian Greek literature. The latter may include theological tracts and hagiographical texts, e.g. martyr-acts, such as the Passion of Pionius or the Passion of Perpetua.]

CLASS 307–308 Independent Study in Greek, Undergraduate Level
307, fall; 308, spring. Up to 4 credits.

CLASS 310 Greek Undergraduate Seminar # (IV)
Fall and spring. 4 credits. Prerequisite: two 200-level courses in Greek or permission of instructor. Fall topic: Symposia. P. Pucci. Spring topic: Herodotus. K. Clinton.
Symposia: extensive passages from Plato's *Symposium* and Xenophon's *Symposium* are read. Literary and pictorial evidence that illustrates the erotic, social, and cultural importance of this Greek institution are studied.

[CLASS 342 Greek Prose Composition
Spring. 4 credits. Prerequisite: CLASS 201 or permission of instructor. Not offered 2001–2002. P. Pucci.]

[CLASS 417 Advanced Readings in Greek # (IV)
4 credits. Not offered 2001–2002.]

[CLASS 419 Advanced Greek Composition
4 credits. Prerequisite: CLASS 342 or equivalent. Not offered 2001–2002.]

CLASS 511 Greek Philosophical Texts (also PHIL 411)
Fall and spring: up to 4 credits. Prerequisites: knowledge of Greek and permission of instructor. T. Irwin, C. Brittain.
Readings of Greek philosophical texts in the original.

CLASS 545 Graduate TA Training
Fall and spring. 1 credit. H. Pelliccia and D. Shanzer.
Pedagogical instruction and course coordination. Required for all graduate student teachers of CLASS (Latin) 105–106 and Classics First-Year Writing Seminars.

[CLASS 555 Graduate Proseminar
Fall. 1 credit. Not offered 2001–2002. Staff.
Graduate students are introduced to the tools, techniques, and methods of classical scholarship.]

CLASS 605–606 Graduate Survey of Greek Literature
605, fall; 606, spring. 4 credits each term. Prerequisite: linguistic proficiency to be determined by instructor. J. Rife.
A survey of Greek literature in two semesters. CLASS 605: Greek literature from Homer to the mid-fifth century. H. Pelliccia. CLASS 606: Greek literature from the late fifth century to the Empire.

[CLASS 632 Topics in Ancient History (also CLASS 450 and HIST 450/630)
Fall. 4 credits. Not offered 2001–2002. B. Strauss.
For description, see HIST 630.]

CLASS 671 Graduate Seminar in Greek: The Pre-Socratics (also PHIL 619)
Fall. 4 credits. D. Sedley.
The philosophical positions and arguments of the major fifth-century BC pre-Socratic thinkers, from Heraclitus to Democritus.

CLASS 672 Graduate Seminar in Greek: Hesiod
Spring. 4 credits. P. Pucci.

CLASS 701–702 Independent Study for Graduate Students in Greek
701, fall; 702, spring. Up to 4 credits.

Latin

CLASS 105 Latin for Beginners
Fall. 4 credits. Staff.
An introductory course designed to prepare students to start reading Latin prose at the end of a year. The class moves swiftly and meets daily. Work includes extensive memorization of vocabulary and paradigms; study of Latin syntax; and written homework, quizzes, tests, and oral drills.

CLASS 106 Elementary Latin
Spring. 4 credits. *Provides language qualification.* Prerequisite: 105 or equivalent. Staff.
A continuation of CLASS 105, using readings from various authors; prepares students for CLASS 205.

CLASS 107 Intensive Latin
Spring and summer. 6 credits. *Provides language qualification.* Staff.
An intensive introduction that lays down the essentials of Latin grammar before progressing rapidly to readings from selected authors in the original Latin. Prepares students in a single semester for CLASS 205.

CLASS 108 Latin in Review
Fall. 4 credits. *Provides language qualification.* Prerequisite: placement by departmental examination. D. Shanzes.
This course is designed to accommodate students who have had some Latin, but are insufficiently prepared to take 106. It begins with review of some material covered in 105 and then continues with second-term Latin material (106). The class moves swiftly and meets daily. Work includes extensive memorization of vocabulary and paradigms; study of Latin syntax; and written homework, quizzes, tests, and oral drills. Students should be ready for CLASS 205 by the end of the course.

CLASS 205 Intermediate Latin # (IV)
Fall and spring. 3 credits. *Satisfies language proficiency.* Prerequisite: CLASS 106, 107, 108, or placement by departmental examination. Fall: E. Hohendahl; spring: D. Mankin.
Readings in Latin prose.

CLASS 207 Catullus # (IV)
Fall. 3 credits. Prerequisite: CLASS 205. D. Mankin.

[CLASS 208 Roman Drama # (IV)
3 credits. Prerequisite: CLASS 205. Not offered 2001–2002. Staff.]

CLASS 216 Vergil # (IV)
Spring. 3 credits. Prerequisite: CLASS 205. J. Ginsburg.

CLASS 227–228 Independent Study in Latin, Undergraduate Level
227, fall; 228, spring. Up to 4 credits. Only by permission of the DUS in the case of documented schedule conflict. Staff.

CLASS 312 Latin Undergraduate Seminar # (IV)
Fall and spring. 4 credits. Prerequisite: 2 terms of 200-level Latin or permission of instructor. Fall topic: Cicero Murder Trials. J. Ginsburg. Spring topic: Petronius and Apuleius. D. Shanzer.
Cicero Murder Trials: among the most famous of Cicero's speeches are those undertaken for the defense of men charged with murder or attempted murder. In this course we read and examine two of the speeches written for murder trials, those in defense of Marcus Caelius Rufus and Titus Annius Milo. Our focus is the rhetorical strategies employed by Cicero to persuade his audience of his clients' innocence; we also examine these speeches within the historical context of the late Republic, a time of political turmoil and of changed social mores and attitudes.

[CLASS 314 The Augustan Age # (IV)
4 credits. Prerequisite: 2 terms of 200-level Latin or permission of instructor. Not offered 2001–2002. Staff.]

CLASS 315–316 Independent Study in Latin, Undergraduate Level
315, fall; 316, spring. Up to 4 credits.

[CLASS 317 Roman Historiography # (III or IV)
4 credits. Prerequisite: 1 term of 300-level Latin or permission of instructor. Not offered 2001–2002. J. Ginsburg.]

CLASS 341 Latin Prose Composition #
4 credits. Prerequisite: 1 term of 200-level Latin or permission of instructor. K. Clinton.

CLASS 369 Intensive Mediaeval Latin Reading # (IV)
Summer only. 4 credits. D. Shanzer.
Web site: www.arts.cornell.edu/classics/Classes/Classics 369/Med_Latin.html

CLASS 411 Advanced Readings in Latin Literature: Ciceronian Invective # (IV)
Fall. 4 credits. J. Ginsburg.

CLASS 412 Advanced Readings in Latin Literature: Propertius # (IV)
Spring. 4 credits. D. Mankin.

[CLASS 420 Plautus # (IV)
4 credits. Prerequisite: at least one 300-level Latin course or permission of instructor. Not offered 2001–2002. A. Nussbaum.]

[CLASS 441 Advanced Latin Prose Composition
Spring. 4 credits. For graduate students. Only those undergraduates who have completed CLASS 341 and have permission of the instructor may enroll. Not offered 2001–2002. Staff.]

[CLASS 555 Graduate Proseminar
Fall. 1 credit. Not offered 2001–2002. Staff. Graduate students are introduced to the tools, techniques, and methods of Classical scholarship.]

[CLASS 603 Later Latin Literature: Late Antique and Medieval Hagiography
Spring. 4 credits. Not offered 2001–2002. D. Shanzer.]

[CLASS 625–626 Graduate Survey of Latin Literature
625 fall; 626 spring. 4 credits each term. Prerequisite: linguistic proficiency to be determined by instructor. Not offered 2001–2002.
A survey of Latin literature in two semesters. 625: Latin poetry from its beginnings to the early Empire. 626: Latin literature of the Empire.]

CLASS 679 Graduate Seminar in Latin: The Flavians
Fall. 4 credits. F. Ahl.

[CLASS 680 Graduate Seminar in Latin
Spring. 4 credits. Not offered spring 2002.]

CLASS 751–752 Independent Study for Graduate Students in Latin
751, fall; 752, spring. Up to 4 credits.

Classical Art and Archaeology

CLASS 220 Introduction to Art History: The Classical World (also ART H 220) # (IV)
Spring. 4 credits. A. Ramage.
An overview of the art and archaeology of the Greek and Roman world. The sculpture, vase painting, and architecture of the ancient Greeks from the Geometric period through the Hellenistic, and the art of the Romans from the early Republic to the late empire and early Christianity. An introduction to the social, cultural, economic, and religious contexts of classical art in the ancient Mediterranean. Discussion of critical methods, formal analyses, and practical techniques of art historians and classical archaeologists.

[CLASS 221 Minoan-Mycenaean Art and Archaeology (also ARKEO 221 and ART H 221) # (IV)
Spring. 3 credits. Not offered 2001–2002. J. Coleman.
The birth of civilization in Greece and the Aegean islands during the Bronze Age. The main focus is on the rise and fall of Minoan Crete and Mycenaean Greece, with consideration given to the nature and significance of Aegean interactions with Egypt, the Near East, and Anatolia.]

[CLASS 232 Archaeology in Action I (also ARKEO 232 and ART H 224) # (IV)
3 credits. Prerequisite: permission of instructor. Not offered 2001–2002. P. I. Kuniholm.]

[CLASS 233 Archaeology in Action II (also ARKEO 233 and ART H 225) # (IV)
3 credits. Prerequisite: permission of instructor. Not offered 2001–2002. P. I. Kuniholm.
For description, see Art H 225.]

[CLASS 256 Practical Archaeology (also ARKEO 256) (III or IV)
Spring. 3 credits. Not offered 2001–2002. J. Coleman.
An introduction to the aims and methods of field archaeology. Topics covered include: remote sensing (satellite images and aerial photos); surface survey; subsurface investigations by magnetometer, ground penetrating radar, etc.; the layout and development of a land excavation; underwater excavations; the collection, description, illustration, and analysis of artifacts and data, such as pottery, lithics, botanical samples, and radiocarbon samples. Hands-on experience with potsherds and other artifacts from prehistoric and Classical Greece and Cyprus in the university's collections is intended to prepare students for work in the field.]

CLASS 309 Dendrochronology of the Aegean (also ARKEO 309 and ART H 309) # (III or IV)
Fall and spring. 4 credits. Prerequisite: permission of instructor. Letter grade only. Limited to 10 students. P. I. Kuniholm.
For description, see ART H 309.

CLASS 319 Art in the Daily Life of Greece and Rome (also ART H 319) # (IV)
Spring. 4 credits. A Ramage.
For description, see ART H 319.

[CLASS 320 The Archaeology of Classical Greece (also ART H 320) # (IV)
4 credits. Not offered 2001–2002. A. Ramage.]

[CLASS 321 Mycenae and Homer (also ARKEO 321 and ART H 321) # (IV)
Fall. 4 credits. Prerequisite: at least 1 previous course in archaeology, classics, or history of art. Not offered 2001–2002. J. Coleman.
Study of the relationship between the Mycenaean period of Greece (known primarily from archaeology) and the Homeric *Iliad* and *Odyssey*. Topics include Mycenaean architecture, burial customs, kingship, and military activities; the reasons for the collapse of the Bronze Age palatial economies; the archaeological evidence for society in the "Dark Ages" that followed; the writing systems of Mycenaean Greece (Linear B) and the Iron Age (the Semitic/Greek alphabet); the nature of the Homeric poems and their value as historical sources.]

[CLASS 322 Greeks and Barbarians (also ART H 328) # (IV)
Fall. 4 credits. Prerequisite: CLASS 220 or 221, or permission of instructor. Not offered 2001–2002. J. Coleman.
A study of the archaeological and other evidence for the interaction between Greek civilization and the peoples of the eastern and western Mediterranean from the thirteenth to the fourth centuries B.C.E. The course focuses on Greek relationships with Egypt, Phoenicia, Cyprus, Anatolia, and Italy in the post-Bronze Age period.]

[CLASS 323 Painting in the Greek and Roman World (also ART H 323) # (IV)
4 credits. Not offered 2001–2002. A. Ramage.]

[CLASS 325 Greek Vase Painting (also ART H 325) # (IV)
Fall. 4 credits. Not offered 2001–2002. A. Ramage.
For description, see ART H 325.]

[CLASS 327 Greek and Roman Coins (also ART H 327) # (IV)
4 credits. Not offered 2001–2002. A. Ramage.
For description, see ART H 327.]

[CLASS 329 Greek Sculpture (also ART H 329) # (IV)
4 credits. Not offered 2001–2002. J. Coleman.
An examination of ancient Greek sculpture, both three-dimensional and two-dimensional, from the Archaic to the Hellenistic period. Aspects of the works studied include: technological advances, changing ideology of the sculptors, regionalism of styles, and taste of individual patrons.]

[CLASS 350 Arts of the Roman Empire (also ART H 322) # (IV)
Fall. 4 credits. Not offered 2001–2002. A. Ramage.
For description, see ART H 322.]

CLASS 357–358 Independent Study in Classical Archaeology, Undergraduate Level
357, fall; 358, spring. Up to 4 credits.

[CLASS 423 Ceramics (also ARKEO 423 and ART H 423) # (IV)
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. A. Ramage.
For description, see ART H 423.]

[CLASS 430 Seminar on the Bronze Age Architecture of Asia Minor (also ARKEO 425 and ART H 425) # (IV)
Spring. 4 credits. Not offered 2001–2002. P. I. Kuniholm.
For description, see ART H 425.]

[CLASS 432 Sardis and the Cities of Asia Minor (also ARKEO 432 and ART H 424) # (IV)
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. A. Ramage.
For description, see ART H 424.]

CLASS 434 The Rise of Classical Greece (also ARKEO 434 and ART H 434) # (IV)
Spring. 4 credits. Recommended: CLASS 220 or 221, ART H 220 or 221, or permission of instructor. P. I. Kuniholm.
For description, see ART H 434.

CLASS 435 Seminar on Roman Art and Archaeology (also ARKEO 435 and ART H 427) # (IV)
Spring. 4 credits. Prerequisite: permission of instructor. A. Ramage.
For description, see ART H 427.

[CLASS 629 The Prehistoric Aegean (also ARKEO 629)
4 credits. Not offered 2001–2002. J. Coleman.
Seminar with focus on the Aegean and neighboring regions in the Neolithic and Early Bronze Ages.]

[CLASS 630 Seminar in Classical Archaeology (also ARKEO 520 and ART H 520)
Fall. 4 credits. Not offered 2001–2002. J. Coleman.]

CLASS 721–722 Independent Study for Graduate Students in Classical Archaeology
721, fall; 722, spring. Up to 4 credits.

Greek and Latin Linguistics

[CLASS 421 Greek Comparative Grammar (also LING 451) (III)
4 credits. Prerequisite: thorough familiarity with the morphology of classical Greek. Not offered 2001–2002. A. Nussbaum.
The prehistory and evolution of the sounds and forms of ancient Greek as reconstructed by comparison with the other Indo-European languages.]

CLASS 422 Latin Comparative Grammar (also LING 452) (III)
4 credits. Prerequisite: thorough familiarity with the morphology of classical Latin. A. Nussbaum.
The prehistory and evolution of the sounds and forms of Classical Latin as reconstructed by comparison with the other Indo-European languages.

[CLASS 424 Italic Dialects (also LING 454) (III)
4 credits. Not offered 2001–2002. A. Nussbaum.]

[CLASS 425 Greek Dialects (also LING 455) (III)
Fall. 4 credits. Not offered 2001–2002. A. Nussbaum.]

CLASS 426 Archaic Latin (also LING 456) (III)
Spring. 4 credits. Prerequisite: reading knowledge of Latin. A. Nussbaum.
Reading of epigraphic and literary pre-Classical texts with special attention to archaic and dialectal features. The position of Latin among the Indo-European languages of ancient Italy, the rudiments of Latin historical grammar, and aspects of the development of the literary language.

[CLASS 427 Homeric Philology (also LING 457) (III)
4 credits. Prerequisite: ability to read Homeric Greek. Not offered 2001–2002. A. Nussbaum.
The language of the Homeric epics: dialect background, archaisms, modernizations. The notion of a *Kunstsprache*: its constitution, use, and internal consistency. The phonological and morphological aspects of epic compositional technique.]

[CLASS 429 Mycenaean Greek (also LING 459) (III)
Spring. 4 credits. Prerequisite: thorough familiarity with the morphology of Classical Greek. Not offered 2001–2002. A. Nussbaum.]

Sanskrit

CLASS 131–132 Elementary Sanskrit (also LING 131–132 and SANSK 131–132)
131, fall; 132, spring. 4 credits each term. *CLASS 132 provides language qualification.* C. Minkowski.
An introduction to the essentials of Sanskrit grammar. Designed to enable the student to read classical and epic Sanskrit as quickly as possible.

[CLASS 251–252 Intermediate Sanskrit (also LING 251–252 and SANSK 251–252) @ # (IV)
251, fall; 252, spring. 3 credits each term. *CLASS 251 provides language proficiency.* Prerequisite: CLASS 132 or equivalent. Not offered 2001–2002; next offered 2002–2003. C. Minkowski.
Readings from the literature of Classical Sanskrit. Fall: selections from the two Sanskrit epics, the *Mahabharata* and the *Ramayana*. Spring: more selections from the epics, and from either Sanskrit story literature or from Sanskrit dramas.]

CLASS 403–404 Independent Study in Sanskrit, Undergraduate Level
403, fall; 404, spring. Up to 4 credits. C. Minkowski.

CLASS 703–704 Independent Study for Graduate Students in Sanskrit
703, fall; 704, spring. Up to 4 credits. C. Minkowski.

Also see CLASS 291, 390, and 395 (Classical Civilization listings).

Honors Courses

CLASS 472 Honors Course: Senior Essay
Fall and spring. 8 credits. An adviser must be chosen by the end of the student's sixth semester. Topics must be approved by the Standing Committee on Honors by the beginning of the seventh semester.
See "Honors," Classics front matter.

Related Courses in Other Departments and Programs

See listings under:

Archaeology
Asian Studies
Comparative Literature
English
History
History of Art
Medieval Studies
Linguistics
Near Eastern Studies
Philosophy
Religious Studies
Society for the Humanities
Women's Studies

COMPARATIVE LITERATURE

N. Saccamano, chairman (247 Goldwin Smith), W. J. Kennedy (fall), C. Chase (spring), director of Undergraduate Studies, (247 Goldwin Smith); C. Carmichael (fall), N. Melas (spring), director of Graduate Studies (247 Goldwin Smith); A. Adams, F. Ahl, C. Arroyo, A. Caputi (Emeritus), C. Carmichael, D. Castillo, C. Chase, W. Cohen, J. Culler, B. deBary, S. Donatelli, D. Grossvogel (Emeritus), P. Hohendahl, W. Holdheim (Emeritus), W. J. Kennedy, N. Melas, J. Monroe, E. Rosenberg, N. Saccamano, N. Sakai, J. Stark, L. Waugh (Emeritus), W. Wetherbee.

Also cooperating: L. Adelson, R. Brann, P. Carden, H. Deinert, J. E. Gainor, P. Gilgen, D. LaCapra, D. Mankin, B. Maxwell, T. McNulty, L. Meixner, N. Pollak, P. Rehberg, J. Resina, R. Schneider, D. Schwarz, M. Steinberg, S. Stewart, S. Toorawa, G. Waite.

The Department of Comparative Literature provides a broad range of courses in European as well as non-European literature. Courses stress significant authors, themes, problems, styles, genres, historical periods, and theoretical perspectives. In cooperation with related departments in the humanities, the departmental offerings reflect current interdisciplinary approaches to literary study: hermeneutics, semiotics, deconstruction, cultural criticism, Marxism, reception aesthetics, feminism, and psychoanalysis.

The Major

The major enables students to develop an integrated knowledge of Western literature, to strengthen their reading and writing abilities, and to prepare for careers demanding analytical, interpretive, and evaluative skills. Prospective majors should consult with the director of undergraduate studies. After declaring a major, a student chooses an adviser from the department's faculty. The requirements for the major are designed to allow each student to follow a course of study that combines intellectual rigor with the pursuit of personal interests. The specific contours of such a program are worked out in consultation with the student's adviser.

Requirements for the Major

1) Five courses in Comparative Literature at the 200 level and above, including the core course listed below. A student may include up to two literature courses from other departments.
2) One core course in Comparative Literature (for 2001–2002 COM L 365 [fall]), COM L 370 [spring], to be taken by all majors in their junior or senior year. At the discretion of the department, students may enroll in core courses in both their junior and senior years.
3) Five courses in literature and other areas of the humanities at the 200 or higher level, to be taken in one or more foreign literature departments. Texts must be read in the original language. A student may offer one language course (conversation, composition, etc.) towards fulfilling the language requirement.
4) An honor's essay (COM L 493) of roughly 50 pages is now optional. It is to be written during the senior year under the direction of a faculty member, preferably from within the department, who has agreed to work in close cooperation with the student. Students are urged to begin research on their thesis topic during the summer preceding their senior year. In lieu of a Senior Honors Essay, students may take one course at the 400–600 level.

The department also encourages:

1) a program that includes broad historical coverage (e.g., COM L 201–202: Great Books); intensive study of a single genre (e.g., COM L 363–364: The European Novel, COM L 365: Contemporary Fiction); analysis of problems in literary theory (e.g., COM L 302: Literature and Theory). The department also offers a number of strongly recommended 200-level courses designed to acquaint undergraduates with the discipline: COM L 203: "Introduction to Comparative Literature," as well as broadranging introductory courses in World Fiction (COM L 204) and Introduction to Literary Criticism (COM L 206).

Honors

A student who completes the requirements for the major is eligible for the degree of Bachelor of Arts with honors in comparative literature. The department bases its decision on the students achieving grades of at least B+ on the senior essay, in course work for the major, and in their overall academic performance at Cornell.

First-Year Writing Seminars

Most 100-level courses may be used toward satisfying the freshman writing seminar requirements. See "John S. Knight Institute for Writing in the Disciplines" for a full description of the first-year seminar program.

Courses

COM L 201 Great Books # (IV)
Fall. 4 credits. COM L 201 and 202 may be taken independently of each other.
S. Donatelli.
A reading each semester of seminal texts that represent and have shaped Western culture and hence form an essential part of the student's intellectual equipment. By analyzing, interpreting, and evaluating, students develop critical reading abilities. Selections from the Bible, Homer, Dante, Rabelais, Shakespeare, and others.

COM L 202 Great Books (IV)
Spring. 4 credits. N. Melas.
World literature of the last 300 years, emphasizing the response to European worldwide expansion first in the colonizing countries, then in the colonized. A central concern is the globalization of European literary forms. Readings likely to include selections from Camoens, Shakespeare, Behn, Voltaire, Melville, Conrad, Tagore, Lu Hsun, Borges, Cesaire, Mahfouz, Soyinka, Enichi, Erdrich, and others as well as selected lyric poets.

COM L 203 Introduction to Comparative Literature (also ASIAN 203) (IV)
Fall. 4 credits. W. J. Kennedy and E. Rosenberg.
The course is intended to answer the question persistently asked by undergraduates: "What *is* comparative literature, anyway?" The format of the course is designed to acquaint students with the range and variety of the field by having members of the department present those aspects which reflect their areas of expertise and their methods of teaching. Of the two meetings each week, the first generally takes the form of a lecture; the second is a discussion of the assigned text. Texts and topics range from the naturalism of Thomas Mann and the word play of James Joyce, to post-modern critical theory.

[COM L 204 Global Fictions (also ASIAN 204) (IV)
Spring. 4 credits. Next offered 2002–2003. N. Melas.]

COM L 206 Introduction to Literary Criticism (IV)
Fall. 4 credits. J. Stark.
More advanced undergraduate seminars naturally tend to focus on contemporary literary theory; after all, it is essential for students of literature to be well-informed about contemporary theoretical debates, methodologies, and problems. But literary theory and criticism did not begin with the structuralist revolution of the 1960s, and it is essential for students to understand earlier developments—many of which still have the power to provoke and inspire. Critical historicization should begin at home, with an awareness of how different the forms, practices, institutions, and politics of literary criticism have been, and this course thus introduces students to the vast field of pre-1960 debates. We examine the historical evolution of key terms now more or less taken for granted as part of critical vocabulary, and we pay particular attention to the (relatively recent) emergence of literature itself as a category of study. No prior knowledge of the subject is assumed, and all texts are read in English.

COM L 208 Shakespeare and the Twentieth Century (also ENGL 208) IV
Spring. 4 credits. W. J. Kennedy.
What is the relationship between the plays of Shakespeare in their own time and the various ways they have functioned in modern culture? We compare selected works of Shakespeare with their adaptations in fiction, theater, film, the educational system, government, and popular culture. The discussion of each play is organized around one or more critical approaches. The course as a whole attempts to provide a systematic introduction to the contemporary study of literature and culture.

COM L 211 The Comic Road to Wisdom (also THETR 214) (IV)
Spring. 4 credits. S. Donatelli.
This course offers an appreciation of comedy not only as a literary mode but as a symbolic attitude, as an essential aspect of human experience, and as a species of pre-reflective consciousness whose appearance especially in pre-modern works can provide valuable orientation for humanists in an increasingly rationalistic and technological age. Readings include literary works by Aristophanes, Plato, Erasmus, Cervantes, Shakespeare, Dickens, Austen, Beckett, Flann O'Brien, Dorothy Parker, and Italo Calvino, and films by the Marx Brothers and by Indian director Mira Nair. Prominent theoretical approaches to the comic by Bergson, Pirandello, Freud, Bakhtin, Auden, Frye, Langer, and others is also offered, as is background on related subtopics such as the carnival, the fool, and laughter. While the course communicates an objective sense of several comic strategies and positions, its main purpose is to encourage, and to provide a forum for, the speculative response that comic literature typically provokes.

[COM L 215 Comparative American Literatures (also AM ST 215) (IV)
Spring. 4 credits. Not offered 2001–2002. B. Maxwell.
Twentieth-century writing from Canada, the United States, the Caribbean, and Latin America. A hemispheric American Studies perspective encourages thinking about and across cultural, linguistic, and national demarcations. This course proposes that a question put by the poet William Carlos Williams—"History, history! What do we fools know or care?"—finds its counter-statement in words from Africa, passed on by the novelist Paule Marshall: "Once a great wrong has been done, it never dies. People speak the words of peace, but their hearts do not forgive. Generations perform ceremonies of reconciliation but there is no end." Countering the literature of amnesia and baseless optimism, the works that we read cannot forget, and decline to forgive, the historical traumas that so bitterly flavor them. Our concern is largely with understanding the aesthetic means and strategies that certain writers use to perform ceremonies *not* bent on reconciliation. Readings (in English) include Joy Kogawa, *Obasan;* Sheila Watson, *The Double Hook;* Hubert Aquin, *The Antiphonary;* Jean Toomer, *Cane;* William Faulkner, *Absalom, Absalom!;* Wilson Harris, *The Palace of the Peacock;* Edward Kamau Brathwaite, *X/Self* and *Trench Town Rock;* Mariano Azuela, *The Underdogs;* Jose Donoso, *Curfew;* and Eduardo Galeano, *The Book of Embraces* and selections from the work of John Sanford, Rosario Castellanos, Clarice Lispector, and Juan Gelman.]

COM L 220 Thinking Surrealisms (IV)
Spring. 4 credits. B. Maxwell.
Borrowing its title from a formulation of the Marxist philosopher Ernst Bloch and beginning from the "forays of demoralization" instigated by the Dadas, who bequeathed to surrealism the precious gift of unreconciliation to the given, this course ranges over the protean expressiveness of several surrealist moments of the last century. The inception of surrealist precept and practice in Paris in the mid-1920s is a consideration, perhaps only slightly more central to the course than the explicitly anti-fascist political phase of the 1930s and '40s; the supplementation of Parisian surrealism by Caribbean, Mexican, African American, Quebecois, and Mauritian writers and artists; the renegade practice of Hans Bellmer and the unschooled surreality of Eugene Atget; the reflections of and on surrealism by Walter Benjamin, Ernst Bloch, and Theodor W. Adorno; the relations of surrealism to the Situationist International; and the recent critiques of surrealism in fiction (Milan Kundera) and scholarship (Hal Foster). Throughout, the course asks what the proliferation of "thinking surrealisms" meant to twentieth-century culture and politics. All readings in English.

COM L 222 Ancient Fiction (also CLASS 222) (IV)
Fall. 4 credits. J. Rife.
See CLASS 222 for full course description.

COM L 225 Poetry and Poetics of Difference (also ENGL 225) (IV)
Spring. 4 credits. Limited to 15 students. *While not restricted to sophomores, this course is intended to offer sophomores especially an opportunity to work closely with faculty in a seminar environment in a strong interdisciplinary context.* J. Monroe.

What is the relationship between the diverse pleasures we experience in poetry and contemporary ethical concerns? In what ways does poetry encourage us to understand and engage, in particular, questions of difference and otherness? In exploring these and related questions, this course begins with a constellation of influential examples from poetry of the past two centuries, then moves to recent discussions from a cross-section of fields including anthropology, philosophy, linguistics, and cultural studies. The latter half of the course explores the role such questions have played across a range of contemporary poetic practices within the United States and abroad over the past two decades, with particular emphasis on the period since 1989. Readings include works by Edgar Allen Poe, Gertrude Stein, Andrē Breton, Adrienne Rich, June Jordan, Kamau Brathwaite, Aimé Césaire, Hans Magnus Enzensberger, Joy Harjo, Rosmarie Waldrop, Charles Bernstein, Michael Palmer, Leslie Scalapino, and Susan Howe.

COM L 236 Greek Mythology (also CLASS 236) # (IV)
Fall. 3 credits. Limited to 200. D. Mankin.
For description, see CLASS 236.

COM L 239 Cultural History of the Jews of Spain (also NES 239, JWST 239, RELST 239 and SPAN L 239) # (IV)
Spring. 3 credits. Staff.
See NES 239 for a full course description.

COM L 256 Introduction to the Q'uran (NES 256, RELST 213, JWST 256) @ # (IV)
Spring. 3 credits. S. Toorawa.
See NES 256 for a full course description.

COM L 302 Literature and Theory (also COM L 622 and ENGL 302/602) (IV)
Fall. 4 credits. J. Culler.
Study of issues in contemporary theoretical debates, with particular attention to structuralism, deconstruction, psychoanalysis, and feminism. Readings from Barthes, Derrida, Foucault, J. Butler, B. Johnson, and others. No previous knowlege of literary theory is assumed.

[COM L 304 Europe and Its Others: An Introduction to the Literature of Colonialism @ (IV)
Fall. 4 credits. Limited to 15. Not offered 2001–2002. N. Melas.
Through an examination of selected works from the early twentieth century to the present from France, England, Africa, and the Caribbean, this course provides an introduction to the literature written alongside and against the historical phenomenon that has arguably had the most far reaching impact in modern history: European colonialism. How was culture instrumental in the political project of domination? How have writers of the postcolonial period attempted to write back? What problems and possibilities does colonialism present for cultural identity and cultural resistance? In addition to close reading of texts and a consideration of historical background we also examine visual representations of colonialism, particularly film. Authors include Conrad, Ngugi, Nandy, Condé, Duras, Salih, Fanon, Memmi, Djebar, Resnais, and Pontecorvo. All readings available in English.]

[COM L 311 Modern European Literature and Culture (also FRLIT 315) (IV)
Spring. 4 credits. Not offered 2001–2002. Staff.
We concern ourselves with European culture as embracing the area from Russia to the Atlantic Ocean, not as divided into Western, Eastern, or Central. European culture crosses the old East-West political boundaries. Case studies: Ireland, France, Czech Republic, Russia.

This course is designed for those interested both in the artistic, imaginative side of European literature and in the ways in which culture expresses some of the most significant concerns of our age. The conceptual links include issues of national identity and social justice, as well as concerns of private emotions and individual personality. Popular culture, film, TV, and theatre are integrated with the reading and class discussion. Some authors who are read: Flaubert, Charlotte Bronte (*Villette*), Karl Marx, Dostoevsky, Mayakovsky, Yeats, Malraux, Camus, Joyce, Solzhenitsyn, Kundera, and others.]

[COM L 326 Christianity and Judaism (also RELST 326) (IV)
Spring. 4 credits. Not offered 2001–2002. C. Carmichael.
A study of the New Testament as a product of the First Century Palestinian and Hellenistic Judaism. Other text (also in translation): *The Passover Haggadah*.]

COM L 328 Literature of the Old Testament (also RELST 328) @ # (IV)
Fall. 4 credits. C. M. Carmichael.
Analysis of small sections of well-known material for in-depth discussion.

COM L 330 Political Theory and Cinema (also GERST 330, GOVT 370, THETR 329) (III or IV)
Fall. 4 credits. G. Waite.
See GERST 330 for full course description.

COM L 332 Dostoevsky (also RUSSL 369) # (IV)
Spring. 4 credits. P. Carden.
See RUSSL 369 for full course description.

COM L 334 Islamic Spain: Culture and Society (also NES 339, JWST 339, SPANL 339) @ # (IV)
Fall. 4 credits. R. Brann.
See NES 339 for full course description.

COM L 335 Modern Western Drama, Modern Western Theater: Theory and Practice (also THETR 335) (IV)
Fall. 4 credits. R. Schneider.
See THETR 335 for full course description.

[COM L 343 Contemporary Mass Culture in Japan and in the U.S. (also ASIAN 363) (IV)
Spring. 4 credits. Enrollment limited to 25. Not offered 2001–2002. B. deBary.
For description, please see ASIAN 363.]

[COM L 344 Tragic Theatre (also CLASS 345) (IV)
Spring. 4 credits. Not offered 2001–2002. F. Ahl.
For course description, please see CLASS 345.]

COM L 353 European Cultural History 1870–1945 (also HIST 363) (III or IV)
Spring. 4 credits. M. Steinberg.
See HIST 363 for full course description.

COM L 356 Renaissance Literature (IV)
Spring. 4 credits. W. J. Kennedy.
An introduction to Renaissance literary texts with some attention to cultural backgrounds and intellectual history. Readings from Machiavelli, Erasmus, Rabelais, Shakespeare, Cervantes, and others.

[COM L 362 The Culture of the Renaissance II (also ENGL 325, HIST 364, MUSIC 390, ART H 351 and RELST 362) (III or IV)
Spring. 4 credits. Next offered 2002–2003. C. Kaske, W. J. Kennedy.
Members of various departments lecture on Luther, Michelangelo, Edmund Spenser, Cervantes, Copernicus, Galileo, and Monteverdi.]

COM L 363 The European Novel # (IV)
Fall. 4 credits. J. Stark.
This course examines the history of the European novel and its forms of representing reality. We study how the structure and themes of the novel emerged against a background of radical social, economic, and political upheavals that held profound consequences for Western conceptions of culture, selfhood, and history. How do novels reflect the world? What can they tell us about structures of knowing and understanding? How do novels interact with the worlds of their readers? To address these questions, detailed analysis of formal and aesthetic issues is combined with discussion of the historical and cultural contexts of the works studied. Readings (in English translation) include novels by Cervantes, Diderot, Stendhal, Flaubert, Dostoevsky, Kafka, Woolf, and Calvino.

COM L 364 The European Novel # (IV)
Spring. 4 credits. E. Rosenberg.
Close readings of some eight texts which essentially chart the history of nineteenth and twentieth-century fiction. Readings from among the following: Austen, *Persuasion*, Balzac, *Old Goriot* or *Eugenie Grandet*; Dickens, *Oliver Twist*; Flaubert, *Madame Bovary*; Tolstoy, *Death of Ivan Ilyich* and *Master and Man*; Mann, *Death in Venice*, and *Mario and the Magician*; Gide, *The Immoralist*; Kafka, *The Metamorphosis*; Woolf, *Mrs. Dalloway*; Nabokov, *Lolita* or *Pale Fire*. All texts read in English; students who command the pertinent foreign language may, of course, read the books in the original.

COM L 365 Contemporary Fiction @ (IV)
Fall. 4 credits. Limited to 15 students. Core course for majors. B. Maxwell.
A study of European fiction and drama largely drawing on texts from the first half of the twentieth century. We pay particular attention to the making of literary types and characters; to traces of utopian and messianic elements; to the relations between memory and political revolution; and to the motive of *ressentiment*. Readings (in translation) chosen from the following: Robert Walser, *Snowwhite* and *The Walk*; Franz Kafka, *The Trial*; Thomas Mann, *Death in Venice*; Bertolt Brecht, *The Rise and Fall of the City of Mahagony*; Joseph Roth, *Hotel Savoy*; Alfred Döblin, *Berlin Alexanderplatz*; Christa Wolf, *The Quest for Christa T.*; Louis Aragon, *Paris Peasant*; Louis-Ferdinand Céline, *Death on the Installment Plan*; Elio Vittorini, *In Sicily*; Natalia Ginzburg, stories; and Isaac Babel, stories. Collateral theoretical readings by Georg Lukács, Ernst Bloch, Bertolt Brecht, Walter Benjamin,

Siegfried Kracauer, Gershom Scholem, Elias Canetti, and Christa Wolf.

COM L 367 The Russian Novel (also RUSS L 367) # (IV)
Fall. 4 credits. N. Pollak.
See RUSSL 367 for a full course description.

COM L 370 Literature and Ethics (IV)
Spring. 4 credits. Limited to 15 students. Core course for majors. J. Stark.
Recent literary criticism has renewed the fraught question of how literature relates to ethics. This question arises most dramatically when incompatible modes of interpreting or representing experience confront each other and consequently destabilize accepted definitions of the law, of moral value, and of historical truth. In this course, we encounter a range of paradigmatic scenes that compel ethical reflection, touching on rituals of mourning, social cooperation and rebellion, and specific traumatic histories. We ask how fiction can foster responsibility to one's historical and social surroundings, both through detailed readings of key literary texts by authors including Sophocles, Baudelaire, Melville, Brecht, Ellison, Morrison, and Celan and through critical analysis of the politics of literature in writings by, among others, Sartre, Adorno, and Blanchot. Students may read texts in the original language or in English translation.

COM L 382 Greeks, Romans, and Victorians (also CLASS 382) # (IV)
Spring. 4 credits. F. Ahl.
See CLASS 382 for full course description.

COM L 404 History into Fiction: Nazis and the Literary Imagination (also JEWST 414, ENGL 404 and GERST 414) (IV)
Fall. 4 credits. Limited to 15. E. Rosenberg.
See ENGL 404 for a full course description.

[COM L 413 Death, Culture, and the Literary Monument (IV)
Fall. 4 credits. Next offered 2002–2003. N. Melas.
Beginning with Homer's *Iliad*, this course inquires into the monumental transformation of death into immortality in the literary composition. How do death's negations become fiction's triumph? We pay particular attention to the fate of this procedure when its subjects are no longer heroic warriors but slaves and women. How do colonial domination and gender difference alter the aesthetic procedures and assumptions underlying commemoration and literary immortality? In addition to death and language, we consider such themes as the relation of antiquity to the present, of identity to its dissolution and of politics to culture. Readings of literary texts drawn from a variety of languages and traditions are attended by selected readings in critical theory and a glance at visual culture, particularly surrounding monuments commemorating the emancipation of slaves and the holocaust. Authors include Homer, Derek Walcott, Simone Schwartz-Bart, Virginia Woolf, Krista Wolf, Tayeb Salih, Maurice Blanchot, Hegel, Orlando Patterson, and Walter Benjamin.]

COM L 417 Faust (also GERST 417) # (IV)
Spring. 4 credits. H. Deinert.
See GERST 417 for a full course description.

COM L 418 Virtual Orientalisms (also ASIAN 415) # (IV)
Fall. 4 credits. Limited to 25 students. B. deBary.
See ASIAN 415 for a full course description.

COM L 419–420 Independent Study
419, fall; 420, spring. Variable credit. COM L 419 and 420 may be taken independently of each other. Applications available in 247 G.S.

[COM L 426 New Testament Seminar (also RELST 426) # (IV)
Fall. 4 credits. Limited to 20 students. Next offered 2003–2004. C. Carmichael.
Identification and discussion of problems in the New Testament.]

COM L 428 Biblical Seminar (also RELST 427) # @ (IV)
Fall. 4 credits. C. Carmichael.
We discuss attitudes to sexuality in the Bible. In Old and New Testament texts we examine the clash between ancestral behavior and subsequent laws and between legal and religious ideas. Topics include: marriage and divorce, incest, intermarriage, gender discrimination, guilt and shame, homosexuality, women and purity, sexual language, and symbols.

COM L 432 Racial Democracy in the Americas (also S HUM 418) (IV)
Spring. 4 credits. Z. Nunes.
See for S HUM 418 for full course description.

COM L 442 Spinoza and New Spinozism (also GERST 409) (IV)
Spring. 4 credits. G. Waite.
See GERST 409 for a full course description.

COM L 446 Translation for the Theatre (also THETR 423/623, COM L 646) (IV)
Spring. 4 credits. J. E. Gainor.
See THETR 423 for full course description.

[COM L 450 Renaissance Poetry (also COM L 650, ENGL 622, ITALL 450/650) (IV)
Spring. 4 credits. Not offered 2001–2002. W. J. Kennedy.
A reading and discussion of key texts in lyric poetry from Italian, French, English, and other European literatures of the Renaissance.]

[COM L 451 Renaissance Narrative (IV)
Spring. 4 credits. Not offered 2001–2002. W. J. Kennedy.
A reading and discussion of key texts in narrative epic and chivalric romance from Italian, French, English, and other European literatures of the Renaissance.]

COM L 452 Renaissance Humanism (also COM L 652) # (IV)
Fall. 4 credits. Enrollment limited to 15. W. J. Kennedy.
A reading and discussion of key texts by Renaissance humanists in Italian, French, English and other European literatures from the fourteenth to seventeenth centuries.

COM L 459 Opera, History, Politics, Gender (also HIST 456, WOMNS 454, S HUM 459, MUSIC 474, ITALL 456) (III or IV)
Spring. 4 credits. M. Steinberg, S. Stewart.
See HIST 456 for full course description.

COM L 461 Art and Social Histories (ART H 461) (IV)
Spring. 4 credits. L. Meixner.
See ART H 461 for a full course description.

[COM L 467 Poetry and Rhetoric (also COM L 667, ENGL 483/683, FRLIT 437/637) (IV)
Fall. 4 credits. Not offered 2001–2002. C. Chase.
In present-day common usage, "poetry" means emotion or beauty, and "rhetoric" means deceptive, decorative language. These incompatible meanings cover over a history of close connection between poetry and rhetoric. Historically, if poetry and rhetoric at times have been seen as opposite, incompatible kinds of language, they also have been identified with each other and strongly distinguished from philosophy and science. Where rhetoric belongs turns out to raise issues of politics and philosophy not only of literary history and language. Such questions and issues have been intently pursued in modern poetry beginning with the Romantics. In this course we read poetry and criticism or "theory" that explore what it means for language to be rhetorical. Readings from Aristotle, Shakespeare, Marvell, Coleridge, Wordsworth, Mallarme, Rilke, Valery, Wallace Stevens, Jean Paulhan, Gerard Genette, Derrida, De Man, and Judith Butler. Two papers (one short, one longer) required. Reading knowledge of French and or German recommended but not required.]

COM L 474 Topics in Modern European Intellectual and Cultural History (also HIST 474/673, JWST 474) (III or IV)
Fall. 4 credits. D. LaCapra.
See HIST 474 for a full course description.

COM L 480 Baudelaire in Context (also COM L 680, FRLIT 488/688) # (IV)
Spring. 4 credits. Prerequisite: reading knowledge of French required. J. Culler.
A reading of *Les Fleurs du Mal* and *Les Petits poemes en prose*, in conjunction with major twentieth-century critical treatments of them, so as to grasp what has been at stake in discussions of Baudelaire. Critics to be read include Benjamin, Bersani, de Man, Friedrich, Jakobson, Jauss, Johnson, and Sartre.

[COM L 482 Latin American Women Writers (also SPANL 492, WOMNS 481) (IV)
Spring. 4 credits. Not offered 2001–2002. D. Castillo.
See SPANL 492 for a full course description.

COM L 483 Imagining the Holocaust (also ENGL 458/658, JWST 458/658, COM L 683, GERST 483) (IV)
Spring. 4 credits. D. Schwarz.
See ENGL 458 for a full course description.

COM L 484 Nationalism and Literature (also SPANL 484) (IV)
Spring. 4 credits. R. Resina.
See SPANL 484 for full course description.

COM L 488 Biblical Diasporas in France (also S HUM 406) (IV)
Fall. 4 credits. Limited to 15 students. Prerequisite: permission of instructor. T. McNulty.
See S HUM 406 for full course description.

COM L 493 Senior Essay
Fall and spring. 8 credits.
Hours TBA individually in consultation with the director of the Senior Essay Colloquium. Approximately 50 pages to be written over the course of two semesters in the student's senior year under the direction of the student's adviser. An "R" grade is assigned on the basis of research and a preliminary draft completed

in the first semester. A letter grade is awarded on completion of the second semester.

[COM L 495 The Cultural Theory of the Frankfurt School (also GERST 495, GOVT 471) (III or IV)
Fall. 4 credits. Not offered 2001–2002. P. Hohendahl.
See GERST 495 for a full course description.]

COM L 496 Theorizing the Public Sphere (also GERST 496) (IV)
Fall. 4 credits. P. Hohendahl.
See GERST 496 for full course description.

COM L 499 Seasons of Migration (also S HUM 409) (IV)
Fall. 4 credits. S. Toorawa.
See S HUM 409 for full course description.

[COM L 604 Translation and the Global Marketplace
Fall. 4 credits. Next offered 2003–2004. N. Melas.]

[COM L 609 Comparison and Cultural Difference
Fall. 4 credits. Next offered 2002–2003. N. Melas.
This course is a wide-ranging investigation of the pitfalls and possibilities for cross-cultural comparison. We examine the structure and mechanisms of comparison, both as a disciplinary method and as a concept or practice: to what extent and in what circumstance can comparison produce cultural difference, consolidate it, dissolve it, erect borders, inhabit borderlands, propose a global ecumene? With particular attention to colonialism and globalization, we inquire into the relation between various modes of comparison and broader contexts and ideologies. Though focused on the humanities and on theoretical texts, readings include incursions into the social sciences and selected poetry and film. Authors may include Lyotard, Foucault, Fanon, Tilley, Gilroy, Clifford, Appadurai, Bhabha, Lanser, Kincaid, Walcott.]

[COM L 610 Modern Japanese Studies: The Formation of the Field in History and Literature (also ASIAN 609)
Spring. 4 credits. Not offered 2001–2002. B. deBary, N. Sakai, J. Koschmann.
See ASIAN 609 for a full course description.]

COM L 619–620 Independent Study
619, fall; 620, spring. Variable credit. COM L 619 and 620 may be taken independently of each other. Applications available in 247 G.S.

COM L 622 Literature and Theory (also COM L 302 and ENGL 302/602)
Fall. 4 credits. J. Culler.
See COM L 302 for a full course description.

[COM L 630 Aesthetics in the Eighteenth Century (also ENGL 630)
Fall. 4 credits. Not offered 2001–2002. N. Saccamano.
See ENGL 630 for a full course description.]

COM L 631 Politics and the Passions: Hobbes to Rousseau (also ENGL 631)
Spring. 4 credits. N. Saccamano.
See ENGL 631 for full course description.

COM L 646 Translation for the Theatre (also THETR 423/623, COM L 446)
Spring. 4 credits. J. E. Gainor.
See THETR 623 for full course description.

[COM L 650 Renaissance Poetry (also COM L 450, ENGL 622, ITALL 450/650)
Spring. 4 credits. Not offered 2001–2002. W. J. Kennedy.
See COM L 450 for a full course description.]

COM L 652 Renaissance Humanism (also COM L 452)
Fall. 4 credits. W. J. Kennedy.

COM L 656 Aesthetic Theory: End of Art (also GERST 656)
Fall. 4 credits. P. Gilgen.
See GERST 656 for full course description.

COM L 661 The Gay Critic (also GERST 641)
Fall. 4 credits. P. Rehberg.
See GERST 641 for full course description.

COM L 665 The Literature of Empire in the Renaissance (also ENGL 626)
Spring. 4 credits. W. Cohen.
Literary responses to the first age of European global expansion, viewed in the context of the category of the Renaissance and the ongoing process of the self-definition of European literature and Western civilization. Emphasis on the interplay between Mediterranean and oceanic imperialism, and on the relationship between ideology and literary form. Readings from lyric poetry, Ariosto, Bacon, Camões, Campanella, Marlowe, Montaigne, More, Rabelais, Shakespeare, Spenser, Tasso, and especially Cervantes. Readings available in English.

[COM L 667 Poetry and Rhetoric (also COM L 467, ENGL 4483/683, FRLIT 437/637)
Fall. 4 credits. Not offered 2001–2002. C. Chase.
See COM L 467 for a full course description.]

COM L 671 Transnational Imaginaries: Globalization and Culture
Spring. 4 credits. Limited to 15 students, advanced undergraduates and graduates. N. Melas.
The term 'gobalization' has become ubiquitous in recent years as the primary conceptual frame and material basis for understanding contemporary transnationalism. It evokes a brave new borderless world in which politics, culture and social formations are no longer necessarily congruent with nor primarily beholden to national boundaries. It triumphantly or despairingly announces the end of history when space precedes time as the measure of human experience, and that experience exceeds the grasp of modernity's autonomous subject. Globalization thus challenges many aspects of our experience of culture—both in its ethnographic and humanist guises—and of the categories through which we apprehend and analyze it. This course provides an introduction to recent writings surrounding globalization in that shifting borderland between the humanities and the social sciences, while focussing on some theoretical implications rather than attempting a comprehensive survey. We dwell specifically on 1) analyzing the relation between the terms "postcolonial" and "global" in recent critical theory. To what extent does the "global" mark the end of the "postcolonial" in transnational relations, particularly between the so-called first and third worlds? 2) examining culture's relation to space, time and subjectivity in view of the "time-space compression" that underlies globalization. Readings are equally divided between critical expository texts and fictional texts (including both literature and film). Knowledge of a language other than English recommended but not required.

[COM L 675 After the Divide: German Critical Theory of the Seventies and Eighties (also GERST 675 and HIST 675)
Fall. 4 credits. Not offered 2001–2002. P. Hohendahl.
See GERST 675 for a full course description.]

COM L 680 Baudelaire in Context (also COM L 480, FRLIT 488/688)
Spring. 4 credits. J. Culler.
For course description, please see COM L 480.

COM L 683 Imagining the Holocaust (also COM L 483, ENGL 458/658, JWST 458/658, GERST 483)
Spring. 4 credits. D. Schwarz.
For course description, please see ENGL 458.

COM L 685 Gramsci and Cultural Politics (also GERST 685, GOVT 675)
Spring. 4 credits. G. Waite.
For description, please see GERST 685.

COM L 688 Postcolonial Theory and German Studies (also GERST 671)
Spring. 4 credits. L. Adelson.
See GERST 671 for full course description.

[COM L 689 Adorno's Aesthetic Theory (also GERST 689)
Fall. 4 credits. Not offered 2001–2002. P. Hohendahl.
See GERST 689 for a full course description.]

[COM L 695 Post-Modern Thought and Area Studies (also JPLIT 614)
Fall. 4 credits. Not offered 2001–2002. B. deBary.
See JPLIT 614 for a full course description.]

COMPUTER SCIENCE

C. Van Loan, chair; B. Arms, G. Bailey, K. Birman, C. Cardie, T. Coleman, R. L. Constable, R. Caruana, A. Demers, R. Elber, D. Fan, J. Gehrke, D. Greenberg, J. Halpern, J. E. Hopcroft, D. Huttenlocher, J. Kleinberg, D. Kozen, L. Lee, G. Morrisett, A. Myers, K. Pingali, F. B. Schneider, D. Schwartz, B. Selman, D. Shmoys, E. G. Sirer, E. Tardos, R. Teitelbaum, S. Vavasis, G. Yona, R. Zabih

The Department of Computer Science is affiliated with both the College of Arts and Sciences and the College of Engineering. Students in either college may major in computer science. For details, visit our web site at www.cs.cornell.edu/ugrad.

The Major

CS majors take courses in algorithms, data structures, logic, programming languages, scientific computing, systems, and theory. Electives in artificial intelligence, computer graphics, computer vision, databases, multimedia, and networks are also possible. Requirements include:

- four semesters of calculus (MATH 111–122 (or 112)–221–222 or 191–192–293–294)
- two semesters of introductory computer programming (COM S 100 and 211)
- a one-credit project (COM S 212)

- a seven-course computer science core (COM S 280, 312, 314, 321 or 322 or 421, 381, 414, and 482)
- two 400+ computer science electives, totaling at least six credits
- a computer science project course (COM S 413, 415, 418, 433, 473, 501, 514, 519, or 664)
- a mathematical elective course (OR&IE 270, MATH 300+, T&AM 310, etc.)
- two 300+ courses that are technical in nature and total at least six credits
- a three-course specialization in a topic area other than computer science. These courses must be numbered 300 level or greater.

Note: All of the field electives described above must be courses of three or more credit hours with the exception of the COM S project course, which may be two credits.

The program is broad and rigorous, but it is structured in a way that supports in-depth study of outside areas. Intelligent course selection can set the stage for graduate study and employment in any technical area and any professional area such as business, law, or medicine. With the adviser, the computer science major is expected to put together a coherent program of study that supports career objectives and is true to the aims of liberal education.

Admission

All potential affiliates are reviewed on a case-by-case basis relative to the following criteria:

1) Completion of MATH 293 (or MATH 221), COM S 211, COM S 212*, and COM S 280.
2) A grade of C or better in all required COM S courses, excluding COM S 100, with the overall average of these courses being not less than 2.7.
3) A grade of C or better in all required math courses, with the overall average of these courses being not less than 2.7 (can include the math-related elective).
4) An overall GPA of not less than 2.0 (2.5 or better recommended).

If any courses are repeated, both grades will be counted in the averages used for admissions. Qualifying courses must be taken at Cornell.

Note: Students who do not meet these requirements are discouraged from attempting affiliation with the major. The COM S major can be exceptionally rigorous for students who are not suitably prepared for the academic requirements of the program and are unlikely to be admitted to the major if they do not meet the admissions standards listed above.

*COM S 212 required for class of 2004 and later.

Honors. To qualify for departmental honors a student must have:

- maintained a cumulative GPA greater than or equal to 3.5
- completed eight credit hours of COM S course work at or above the 500 level (graded courses only; no seminars or two-credit project courses.)
- completed six credit hours of COM S 490 research with a COM S faculty member, spread over at least two semesters and with grades of A- or better.

Note: Honors courses may not be used to satisfy the COM S 400+ elective requirement, the COM S project requirement, the math elective, or the specialization. See the COM S undergraduate web site for more information on eligibility: www.cs.cornell.edu/ugrad.

Courses

For complete course descriptions, see the computer science listing in the College of Engineering section.

COM S 099 Fundamental Programming Concepts
Fall, summer. 2 credits. S-U grades only. No prerequisites. Freshman only.

COM S 100 Introduction to Computer Programming (II)
Fall, spring, summer. 4 credits.
During the fall semester, two versions of COM S 100 (COM S 100M and COM S 100J) are available as described in the computer science listing in the College of Engineering.

COM S 101 Introduction to Cognitive Science (also COGST 101, LING 170, and PSYCH 102) (III)
Fall. 3 credits.

COM S 113 Introduction to C
Fall, spring. 1 credit. Usually weeks 1–4. Prerequisite: COM S 100 or equivalent programming experience. Credit is granted for both COM S 113 and 213 only if 113 is taken first. S-U grades only.

COM S 114 Unix Tools
Fall. 1 credit. Usually weeks 5–8. Prerequisite: COM S 100 or equivalent programming experience. S-U grades only.

COM S 130 Creating Web Documents
Fall. 3 credits. No prerequisites.

COM S 191 Media Arts Studio I (also ART 391, THETR 391)
Fall. 3 credits. Prerequisites: one of the following courses: ART 171, THETR 277, 377, MUSIC 120, or equivalent. Also must be a junior and have permission of instructor. Lab fee $50.
For description, see ART 391.

COM S 201 Cognitive Science in Context Laboratory (also COGST 201 and PSYCH 201) (III)
Fall or spring. 4 credits. Concurrent or prior registration in "Introduction to Cognitive Science" PSYCH 102/COGST 101/COM S 101/LING 170/PHIL 191 is suggested but not required. Knowledge of programming languages is not assumed. Limited to 24 students. Fall, B. Halpern and staff; spring, D. Field and staff.

COM S 202 Transition to Java
Fall, spring. 1 credit. Usually weeks 1–4. Prerequisite: one semester-long programming course.

COM S 211 Computers and Programming (also ENGRD 211) (II)
Fall, spring, summer. 3 credits. Prerequisite: COM S 100 or an equivalent course in Java or C++.

COM S 212 Java Practicum
Fall, spring. 1 credit. Letter grade only. Pre- or corequisite: COM S/ENGRD 211.

COM S 213 C++ Programming
Fall, spring. 2 credits. Prerequisite: COM S 100 or equivalent programming experience. Students who plan to take COM S 113 and 213 must take 113 first. S-U grades only.

COMS 214 Advanced UNIX Programming and Tools
Spring. 1 credit. S-U grade only. Prerequisite: COM S 114 or equivalent.

COM S 230 Intermediate Web Design
Spring. 3 credits. Prerequisite: COM S 130. Not offered every year; may be offered spring 2002.

COM S 280 Discrete Structures
Fall, spring. 4 credits. Pre- or corequisite: COM S 211 or permission of instructor.

COM S 312 Data Structures and Functional Programming (II)
Fall, spring. 4 credits. Prerequisite: COM S 211/212 or equivalent programming experience.

COM S 314 Computer Organization (also ECE 314)
Fall, spring. 4 credits. Prerequisite: COM S 211; COM S 312 or ENGRD 231/ECE 232 recommended, but not required.

COM S 321 Numerical Methods in Computational Molecular Biology (also BIOBM 321 and ENGRD 321) (I)
Fall. 3 credits. Prerequisites: at least one course in calculus such as MATH 106, 111, or 191 and a course in linear algebra such as MATH 221 or 294 or BTRY 417. COM S 100 or equivalent and some familiarity with iteration, arrays, and procedures. COM S majors may use only one of the following toward their degree: COM S 321, 322, or 421.

COM S 322 Introduction to Scientific Computation (also ENGRD 322)
Spring, summer. 3 credits. Prerequisites: COM S 100 and (MATH 222 or 294). COM S majors may use only one of the following toward their degree: COM S 321, 322, or 421.

COM S 324 Computational Linguistics (also COGST 424, LING 424) (III)
Spring. 4 credits. Prerequisites: LING 203; Labs involve work in the UNIX environment; COM S 114 recommended.
For description, see LING 424.

COM S 381 Introduction to Theory of Computing
Fall, summer. 4 credits. Prerequisite: COM S 280 or permission of instructor. Credit will not be granted for both COM S 381 and 481.

COM S 392 Topics in High-level Vision (also COGST 465, PSYCH 465) (III)
Spring. 4 credits.
For description, see PSYCH 465.

[COM S 400 The Science of Programming
Spring. 4 credits. Prerequisite: COM S 280 or equivalent. Not offered every year; semester TBA.]

COM S 409 Data Structures and Algorithms for Computational Science
Spring. 4 credits. This course is not open to COM S majors. Prerequisite: COM S 211 or equivalent programming experience. Not offered every year.

COM S 411 Programming Languages and Logics
Fall. 4 credits. Prerequisites: COM S 312 or permission of instructor. Not offered every year; semester TBA.

COM S 412 Introduction to Compilers
Spring. 3 credits. Prerequisites: COM S 312 (or permission of instructor) and 314. Corequisite: COM S 413.

COM S 413 Practicum in Compilers
Spring. 2 credits. Corequisite: COM S 412. A compiler implementation project related to COM S 412.

COM S 414 Systems Programming and Operating Systems
Fall, spring, summer. 3 credits. Prerequisite: COM S 211, 212, 312 (or permission of instructor), and 314. Corequisite: COM S 415 in spring only.

COM S 415 Practicum in Operating Systems
Fall, spring. 2 credits. Corequisite: COM S 414.

COM S 417 Computer Graphics and Visualization (also ARCH 374)
Spring. 3 credits. Prerequisite: COM S 211.

COM S 418 Practicum in Computer Graphics (also ARCH 375)
Spring. 2 credits. Enrollment limited. Prerequisite: COM S 212 and permission of instructor. Recommended: COM S 314. Corequisite: COM S 417.

COM S 421 Numerical Analysis
Fall. 4 credits. Prerequisites: MATH 294 or equivalent, one additional mathematics course numbered 300 or above, and knowledge of programming. COM S majors may use only one of the following toward their degree: COM S 321, 322, or 421.

COM S 430 Information Discovery
Spring. 3 credits. Prerequisite: COM S 211 or equivalent.

COM S 432 Introduction to Database Systems
Fall. 3 credits. Prerequisites: COM S 312 or 211, 212, and permission of instructor. Recommended: COM S 213 and strong programming skills in C or C++.

COM S 433 Practicum in Database Systems
Fall. 2 credits. Corequisite: COM S 432.

COM S 472 Foundations of Artificial Intelligence
Fall. 3 credits. Prerequisites: COM S 211 and 280 (or equivalent).

COM S 473 Practicum in Artificial Intelligence
Fall. 2 credits. Corequisite: COM S 472.

COM S 474 Introduction to Natural Language Processing (also COGST 474, LING 474)
Spring. 4 credits. Prerequisites: COM S 211.

COM S 478 Machine Learning
Spring. 4 credits. Prerequisites: COM S 280, 312, and basic knowledge of linear algebra and probability theory.

COM S 481 Introduction to Theory of Computing
Fall. 4 credits. Prerequisite: COM S 280 or permission of instructor. Credit will not be granted for both COM S 381 and 481. A faster-moving and deeper version of COM S 381. Corrective transfers between COM S 481 and 381 (in either direction) are encouraged during the first few weeks of instruction.

COM S 482 Introduction to Analysis of Algorithms
Spring, summer. 4 credits. Prerequisites: COM S 280, 312, and either 381 or 481, or permission of instructor.

COM S 483 Quantum Information Processing (also PHYS 481, 681)
Spring. 2 credits. Prerequisite: familiarity with the theory of vector spaces over the complex numbers.

COM S 486 Applied Logic (also MATH 486) (II)
Fall or spring. 4 credits. Prerequisites: MATH 222 or 294, COM S 280 or equivalent (such as MATH 332, 432, 434, 481), and some course in mathematics or theoretical computer science.

COM S 490 Independent Reading and Research
Fall, spring. 1–4 credits.

COM S 501 Software Engineering
Spring. 4 credits. Prerequisite: COM S 211 or equivalent experience programming in Java or C++.

COM S 502 Computing Methods for Digital Libraries
Spring. 3 credits. Prerequisite: COM S 211 and some familiarity with the technology of web sites.

COM S 504 Applied Systems Engineering I (also CEE 504, ECE 512, M&AE 591, ORIE 512)
Fall. 3 credits. Prerequisite: permission of instructor. May not be used to fulfill the COM S 400+ electives.

COM S 505 Applied Systems Engineering II (also CEE 505, ECE 513, M&AE 592, OR&IE 513)
Spring. 3 credits. Prerequisite: Applied Systems Engineering I. May not be used to fulfill the COM S 400+ electives.

COM S 513 System Security
Spring. 4 credits. Prerequisites: COM S 414 or 519 and familiarity with JAVA programming language.

COM S 514 Intermediate Computer Systems
Fall or spring. 4 credits. Prerequisites: COM S 414 or permission of instructor.

COM S 515 Practicum in Systems
Fall or spring. 1–2 credits. Corerequisite: COM S 514.

COM S 519 Computer Networks
Spring. 4 credits. Prerequisites: COM S 314 or permission of instructor. Not offered every year.

COM S 522 Computational Tools and Methods for Finance
Spring. 4 credits. Prerequisites: programming experience (e.g. C FORTRAN, or MATLAB) and some knowledge of numerical methods, especially numerical linear algebra. Not offered every year.

COM S 574 Heuristic Methods for Optimization (also CEE 509)
Spring. 3 or 4 credits. Prerequisite: COM S/ ENGRD 211 or 322 or CEE/ENGRD 241, or graduate standing, or permission of instructor. Not offered every year.

COM S 601 System Concepts
Fall. 3 credits. Prerequisite: open to students enrolled in the COM S Ph.D. program.

COM S 611 Advanced Programming Languages
Fall. 4 credits. Prerequisites: graduate standing or permission of instructor.

COM S 612 Compiler Design for High-Performance Architectures
Spring. 4 credits. Prerequisites: COM S 314 and 412 or permission of instructor.

COM S 613 Concurrent Programming
Spring. 4 credits. Prerequisites: COM S 414 or permission of instructor. Not offered every year; semester TBA.

COM S 614 Advanced Systems
Spring. 4 credits. Prerequisite: COM S 414 or permission of instructor.

COM S 615 Adaptive Systems
Fall. 4 credits. Prerequisites: COM S 614 recommended.

COM S 621 Matrix Computations
Fall. 4 credits. Prerequisites: MATH 411 and 431 or permission of instructor.

[COM S 622 Numerical Optimization and Nonlinear Algebraic Equations
Spring. 4 credits. Prerequisite: COM S 621. Offered in odd-numbered years.]

COM S 624 Numerical Solution of Differential Equations
Spring. 4 credits. Prerequisite: previous exposure to numerical analysis (e.g. COM S 421 or 621) to differential equations, and knowledge of MATLAB. Offered in even-numbered years.

COM S 626 Computational Molecular Biology
Spring. 4 credits. Prerequisites: familiarity with linear programming, numerical solutions of ordinary differential equations and nonlinear optimization methods.

COM S 632 Advanced Database Systems
Spring. 4 credits. Prerequisite: COM S 432/ 433 or permission of instructor.

COM S 664 Machine Vision
Fall or spring. 4 credits. Prerequisites: undergraduate-level understanding of algorithms and MATH 221 or equivalent.

COM S 671 Introduction to Automated Reasoning
Fall. 4 credits. Prerequisite: COM S 611 and graduate standing or permission of instructor.

COM S 672 Advanced Artificial Intelligence
Spring. 4 credits. Prerequisites: COM S 472 or permission of instructor.

COM S 674 Natural Language Processing
Spring. 3 credits. Prerequisites: COM S 472 or permission of instructor. Not offered every year; semester TBA.

[COM S 676 Reasoning about Knowledge
Fall. 4 credits. Prerequisites: mathematical maturity and an acquaintance with propositional logic. Offered in even-numbered years. Not offered 2001–2002.]

[COM S 677 Reasoning about Uncertainty
Fall. 4 credits. Prerequisites: mathematical maturity and an acquaintance with propositional logic. Offered in odd-numbered years. Not offered 2001–2002.]

COM S 681 Analysis of Algorithms
Fall. 4 credits. Prerequisite: COM S 482 or graduate standing.

COM S 682 Theory of Computing
Spring. 4 credits. Prerequisite: (COM S 381 or 481) and (COM S 482 or 681) or permission of instructor.

COM S 683 Advanced Design and Analysis of Algorithms
Spring. 4 credits. Prerequisites: COM S 681 or permission of instructor.

COM S 684 Approximation and Network Algorithms
Fall. 4 credits. Prerequisites: COM S 681 or permission of instructor.

COM S 686 Logics of Programs
Spring. 4 credits. Prerequisites: COM S 481, 682, and (MATH 481 or MATH/COM S 486).

COM S 709 Computer Science Colloquium
Fall, spring. 1 credit. S-U grades only. For staff, visitors, and graduate students interested in computer science.

COM S 713 Seminar in Systems and Methodology
Fall, spring. 4 credits. Prerequisites: a graduate course employing formal reasoning, such as COM S 611, 613, 671, a logic course, or permission of instructor. Not offered every year; semester TBA.

COM S 715 Seminar in Programming Refinement Logics
Fall, spring. 4 credits. Prerequisite: permission of instructor.

COM S 717 Topics in Parallel Architectures
Fall. 4 credits. Prerequisite: COM S 612 or permission of instructor. Not offered every year; semester TBA.

COM S 719 Seminar in Programming Languages
Fall, spring. 4 credits. Prerequisite: COM S 611 or permission of instructor. S-U grades only.

COM S 721 Topics in Numerical Analysis
Fall, spring. 4 credits. Prerequisite: COM S 621 or 622 or permission of instructor. Not offered every year; semester TBA.

COM S 726 Problems in Computational Molecular Biology (also PL BR 726)
Fall, spring. 1 credit. S-U grades only.

COM S 732 Seminar in Database Systems
Fall, spring. 4 credits. S-U grades only.

COM S 754 Systems Research Seminar
Fall, spring. 1 credit. S-U grades only.

COM S 772 Seminar in Artificial Intelligence
Fall, spring. 4 credits. Prerequisite: permission of instructor. S-U grades only.

[COM S 773/774 Proseminar in Cognitive Studies I & II (also COGST, PHIL, LING, and PSYCH 773/774)
Fall, 773; spring, 774. 4 credits. Not offered 2001–2002.]

COM S 775 Seminar in Natural Language Understanding
Fall, spring. 2 credits.

COM S 789 Seminar in Theory of Algorithms and Computing
Fall, spring. 4 credits. Prerequisite: permission of instructor. S-U grades only.

COM S 790 Special Investigations in Computer Science
Fall, spring. Prerequisite: permission of a computer science adviser. Letter grade only. Independent research or Master of Engineering project.

COM S 890 Special Investigations in Computer Science
Fall, spring. Prerequisite: permission of a computer science adviser. S-U grades only. Master of Science degree research.

COM S 990 Special Investigations in Computer Science
Fall, spring. Prerequisite: permission of a computer science adviser. S-U grades only. Doctoral research.

CZECH

See Department of Russian.

DANCE

See under Department of Theatre, Film and Dance.

DUTCH

See Department of German Studies.

EARTH AND ATMOSPHERIC SCIENCES

B. L. Isacks, chair; S. J. Riha, associate chair; directors of undergraduate studies: K. H. Cook (science of earth systems), R. W. Kay (geological sciences), and D. S. Wilks (atmospheric science); R. W. Allmendinger, W. D. Allmon, M. Barazangi, J. M. Bird, L. D. Brown, L. M. Cathles, J. L. Cisne, S. J. Colucci, A. T. DeGaetano, L. A. Derry, P. J. Gierasch, C. H. Greene, T. E. Jordan, S. Mahlburg Kay, M. C. Kelley, F. H. T. Rhodes, D. L. Turcotte, W. M. White, M. W. Wysocki

The new Department of Earth and Atmospheric Sciences joins faculty in the geological sciences with faculty in atmospheric sciences to cover the breadth of modern earth sciences. We live on a planet with finite resources and a finite capacity to recover quickly from human-induced environmental stresses. It is also a powerful planet, with geologic hazards such as earthquakes and volcanic eruptions that alter the course of history with little prior warning. As the human population grows, understanding the earth and its resources becomes progressively more important for both future policymakers and ordinary citizens.

The new department is the home department for three majors: geological sciences, atmospheric sciences, and science of earth systems (SES). Geological sciences emphasizes the solid earth and its history, atmospheric sciences emphasizes basic understanding of modern climate and weather, while the science of earth systems major covers the new disciplines which study the interactions among rock, water, air, and life in our planet's operation. The geological sciences and SES majors are available for students in the College of Arts and Sciences. The geological sciences major is described below, and the SES major is described in the section, "Special Programs and Interdisciplinary Studies." Atmospheric sciences has been proposed as a new major in the College of Arts and Sciences. If approved, the new major would commence during 2001–2002. The goal is to have the breadth of earth sciences available to students in the Colleges of Arts and Sciences, Engineering, and Agriculture and Life Sciences. The community of majors in these inter-collegiate programs share a common interest in a rigorous scientific understanding of how our planet works.

For the latest information about these programs, please consult our web site at www.eas.cornell.edu.

The Geological Sciences Major

The geological sciences major reveals Earth's turbulent history from the formation of our solar system to the plate tectonic cycles that dominate Earth's present behavior. That history is highlighted by the co-evolution of life and the Earth system, a dramatic story that starts with the origin of life in our sun's planetary system and leads to the modern interglacial phase of our planet's latest ice age during which our species has emerged to play a major role in the planetary system. Topics of study also include the fundamental processes responsible for the concentration of mineral and energy resources that have enabled our technological evolution, and include natural hazards such as earthquakes, volcanic eruptions, floods, and landslides which pose dangers to our increasingly vulnerable cities and infrastructure.

The geological sciences major prepares students in geology, geophysics, geochemistry, and geobiology for careers in mineral and petroleum exploration, environmental geology, and academic and government research enterprises. Many of these career tracks involve graduate study, for which the major is excellent preparation. Alternatively, it is a valuable major for a pre-law or pre-med program or in preparation for a career in K–12 education.

In addition to course work, students learn by outdoor fieldwork and involvement in the vigorous research programs of the depart-

ment. Facilities include equipment for processing seismic signals and satellite images of the Earth's surface using extensive libraries of earthquake records, satellite images, and exploration seismic records, and instruments for highly precise chemical and physical analyses of earth materials, including instruments of the Cornell Center for Material Research, Ward Laboratory and the Cornell High Energy Synchotron Source (CHESS). Undergraduates have served as field assistants for faculty members and graduate students in Argentina, Mexico, British Columbia, the Aleutian Islands and southeastern Alaska, Scotland, Switzerland, Tibet, and the Barbados. Undergraduates are encouraged to participate in research activities, frequently as paid assistants.

For admission to the geological sciences major, a student should have made substantial progress toward completing the following basic science requirements for the major: MATH 111–112 or MATH 191–192, PHYS 207–208 or PHYS 112–113, CHEM 207 or 211. Freshmen and sophomores should take an introductory EAS course (or courses), normally EAS 101 or EAS 201, or EAS 102 or EAS 104. Juniors with a strong foundation in mathematics and science may be accepted into the major without an introductory course. Majors take EAS 210, the five 300-level core courses listed below, six credits of additional course work from earth and atmospheric sciences courses numbered 300, 400, or 600, plus an additional course in either computer science or biological science or an intermediate-level course in biological science, mathematics, chemistry, or physics. In addition, a requirement for an advanced outdoor field experience may be met by completing one of the following four-credit options: (a) EAS 417 (Field Mapping in Argentina, 3 credits) and EAS 491 or 492 (based on field observations) for a combined four-credit minimum; (b) EAS 437 (Geophysical Field Methods, 3 credits) plus at least one credit of EAS 491 or 492 using geophysical techniques from EAS 437; (c) EAS 491–492 (Undergraduate Research, 2 credits each) with a significant component of field work; or (d) an approved outdoor field course taught by another college or university (4-credit minimum).

Core Courses

EAS 326 Structural Geology

EAS 355 Mineralogy

EAS 356 Petrology and Geochemistry

EAS 375 Sedimentology and Stratigraphy

EAS 388 Geophysics and Geotectonics

Prospective majors should contact R. W. Kay as early as possible for advice in planning a program. Students majoring in geological sciences may attend the departmental seminars and take advantage of cruises, field trips, and conferences offered through the Department of Earth and Atmospheric Sciences.

Courses offered at the 100 and 200 level are open to all students. Certain 300- and 400-level courses in earth and atmospheric sciences may be of particular interest to students of chemistry, biology, and physics. Students are encouraged to inquire about courses that interest them at the department office in 2122 Snee Hall.

Honors. An honors program is offered by the Department of Earth and Atmospheric Sciences for superior students. Candidates for honors must maintain an overall 3.0 grade-point average, a cumulative average of 3.5 in the major, and complete an honors thesis (EAS 491 or 492). Students interested in applying should contact the director of undergraduate studies during the second semester of the junior year.

Courses

EAS 101 Introductory Geological Sciences (I)
Fall, spring, or summer. 3 credits. Fall, A. Moore; spring, J. M. Bird; summer, W. Brice.
Designed to enhance an appreciation of the physical world. Emphasizes natural environments, surface temperatures, and dynamic processes such as mountain belts, volcanoes, earthquakes, glaciers, and river systems. Interactions of the atmosphere, hydrosphere, biosphere, and lithosphere (earth system science). Water, mineral, and fuel resources; environmental concerns. Field trips in the Ithaca region.

EAS 102 Evolution of the Earth and Life (also BIO G 170) (I)
Spring. 3 credits. J. L. Cisne.
Course topics include: Earth systems and their evolution; Earth history's astronomical context; plate tectonics, continental drift, and their implications for climate and life; co-evolution of life and the atmosphere; precedents for ongoing global change; and dinosaurs, mass extinctions, and human ancestry. Includes laboratories on reconstructing geological history and mapping ancient geography. Fossil collecting on field trips.

EAS 104 The Sea: An Introduction to Oceanography (also BIOEE 154) (I)
Spring, summer. 3–4 credits (4 credits with lab section). Spring: C. H. Greene, W. M. White; summer: J. Chiment.
A survey of the physics, chemistry, geology, and biology of the oceans for both science and nonscience majors. Topics include: seafloor spreading and plate tectonics, marine sedimentation, chemistry of seawater, ocean currents and circulation, the oceans and climate change, ocean ecology, coastal processes, marine pollution, and marine resources.

EAS 105 Writing on Rocks (Freshman Seminar)
Fall, spring. 3 credits. J. Chiment.
See Freshman Seminar Handbook for description.

EAS 106 Vertebrate Fossil Preparation
Fall, spring. 1 credit. Prerequisite: 1 introductory geology course or concurrent enrollment, class size is limited. J. Chiment.
A laboratory-oriented course that exposes students to techniques of vertebrate fossil preparation. Roughing-out and fine preparation of large specimens in solid matrix are covered, as well as screen washing and microscope techniques for the recovery of micro-vertebrate remains. Specialized scanning techniques are discussed.

The class meets for one hour each week for the first six weeks of the semester. Students are assigned to an individual or group project requiring two hours of participation each week for the remainder of the semester.

EAS 107 How the Earth Works
Fall. 1 credit. J. L. Cisne.
A user-friendly introduction to the workings and interactions of solid earth, ocean, atmosphere, and life as they relate to understanding ongoing global change.

EAS 109 Dinosaurs
Fall. 1 credit. J. L. Cisne.
An introductory survey course for anyone interested in dinosaurs. Lectures examine the fossil evidence and illustrate how various geological and biological disciplines contribute to understanding dinosaurs and their world.

EAS 111 To Know the Earth and Build a Habitable Planet (I)
Fall. 3 credits. J. M. Bird.
Acquaints the nonscientist with Earth. Course topics include: major features and how Earth has evolved; Earth system science and building a habitable planet; effects of human activity on geologic environments, mitigating environment damage, living with natural hazards; and mineral resource use in the twenty-first century and an environmentally sound fuel-minerals cycle.

EAS 122 Earthquake! (also ENGRI 122) (I)
Fall. 3 credits. L. D. Brown.
The science of natural hazards and strategic resources is explored. Techniques for locating and characterizing earthquakes and assessing the damage they cause; methods of using sound waves to image the earth's interior to search for strategic minerals; the historical importance of such resources. Seismic experiments on campus to probe for groundwater, the new critical environmental resource.

EAS 131 Basic Principles of Meteorology (I)
Fall. 3 credits. M. W. Wysocki.
A simplified treatment of the structure of the atmosphere: heat balance of the Earth; general and secondary circulations; air masses, fronts, and cyclones; and hurricanes, thunderstorms, tornadoes, and atmospheric condensation. In the laboratory, emphasis is on techniques of analysis of weather systems.

EAS 150 Introduction to Fortran Programming
Fall. 3 credits. M. W. Wysocki.
An introduction to the elements of computer programming using Fortran. Exercises involve mainly meteorological problems.

EAS 200 Art, Archaeology, and Analysis (also ARKEO 285, ART H 200, ENGRI 185, PHYS 200) (I or IV)
Spring. 3 credits. R. W. Kay.
An interdepartmental course on the use of techniques of science and engineering in cultural research. Applications of physical and physiological principles to the study of archaeological artifacts and works of art. Historical and technical aspects of artistic creation. Analyses by modern methods to deduce geographic origins and for exploration, dating, and authentication of cultural objects. Does not meet liberal studies distribution requirement for engineering.

EAS 201 Introduction to the Physics and Chemistry of the Earth (also ENGRD 201) (I)
Fall. 3 credits. Prerequisites: PHYS 112 or 207. L. M. Cathles.
Course topics include: formation of the solar system: accretion and evolution of the earth;

the rock cycle: radioactive isotopes and the geological time scale, plate tectonics, rock and minerals, earth dynamics, mantle plumes; the hydrologic cycle: runoff, floods and sedimentation, groundwater flow, and contaminant transport; and the weathering cycle: chemical cycles, CO_2 (weathering), rock cycle, controls on global temperature (CO_2 or ocean currents), oil, and mineral resources.

[EAS 203 Natural Hazards and the Science of Complexity (I)
Fall. 3 credits. Prerequisites: 1 calculus course. Not offered 2001–2002.
D. L. Turcotte.
Studies of natural hazards; earthquakes, volcanic eruptions, floods, hurricanes, tornadoes, severe storms, wildfires, meteor impacts. Applications of the science of complexity to natural hazards: fractals, chaos, and self-organized criticality.]

EAS 210 Introduction to Field Methods in Geological Sciences (I)
Fall. 3 credits. 1 lecture, Saturday field trips. Prerequisites: EAS 101 (or 201) or permission of instructor.
R. W. Allmendinger.
Course covers the methods by which rocks are used as a geological database. Topics include field methods used in the construction of geological maps and cross sections; systematic description of stratigraphic sections. There are field and laboratory sessions on Saturdays until Thanksgiving. There is one additional lecture during most of these weeks. Course includes one weekend field trip to eastern New York.

EAS 212 Caribbean Field Trip
Spring. 2 credits. Prerequisite: permission of instructor. Enrollment limited to 15.
Approximate cost $1,100. L. D. Brown.
A multidisciplinary look at earth science and environmental issues represented in the Yucatan Peninsula of Mexico. Base for operations is the Centro Ecologico Akumal, located on the Caribbean coast south of Cancun. This coast and its associated reef epitomizes the conflict between ecological preservation and economic development on an international scale. Excursions may include visits to Merida, a historic Spanish town which lies above the buried impact structure that many believe resulted in the death of the dinosaurs; ruins at Chichen Itza, Mayapan, Coba, and Tulum associated with the rise and fall of Mayan culture; and wildlife (monkeys, jaguars, crocodiles) preserves where recent geological studies have found evidence that the fall of the Mayans may have been triggered by climate change. The field trip features snorkel tours of reefs and lagoons as well as the cenotes (sinkholes) that characterize this classic karst landscape. Weekly lectures during the semester provide background; field trip scheduled for January.

EAS 213 Marine and Coastal Geology
Summer. 2 credits. Prerequisite: an introductory course in geology or permission of instructor. Staff.
A special one-week course offered at Cornell's Shoals Marine Laboratory (SML) on an island near Portsmouth, New Hampshire. For more details and an application, consult the SML office, G14 Stimson Hall. Estimated cost for 2002 (including tuition, room, board, and ferry transportation) is $1,100.

EAS 250 Meteorological Observations and Instruments
Spring. 3 credits. Lab fee $50.
M. W. Wysocki.
Methods and principles of meteorological measurements and observations including surface, free-air, and remote systems. Topics include: instrument siting, mounting, and protection; instrument response characteristics, calibration, and standardization; and recorders and data logging systems. Includes laboratory exercises in observation and data analysis. Intended to serve as preparation for Observers Examination.

EAS 260 Soil Science (also CSS 260) (I)
Fall. 4 credits. S-U grades optional.
S. J. Riha.
Designed for students interested in a comprehensive introduction to soil science from both an environmental and plant management perspective, this course is divided into three units. A unit on soil information introduces students to soil characterization, testing, mapping, classification, GIS, and land evaluation. A soil management unit addresses fertility, pest management, water, and microclimate, as well as erosion, conservation, pollution, and soil health. The unit on the role of soils in ecosystems considers topics such as biodiversity, soils as sinks and sources of greenhouse gases, and the impact of soils on land use. Labs are initially field-oriented with an emphasis on learning practical skills needed to evaluate and manage soils. Subsequent labs focus on accessing, interpreting, and applying soil information.

EAS 296 Forecast Competition
Fall and spring. 1 credit. S-U grades only. Prerequisites: sophomore undergraduate standing in atmospheric science or permission of instructor. D. S. Wilks.
This two-semester course provides daily exercise in probabilistic weather forecasting, in which students compete to forecast local weather most skillfully. Enroll for two consecutive semesters, with credit awarded after the second semester. May be repeated for credit.

EAS 302 Evolution of the Earth System (I)
Spring. 4 credits. Prerequisites: MATH 112 or 192 and CHEM 207 or equivalent.
W. M. White, W. D. Allmon, and B. L. Isacks.
Course covers the co-evolution of life and the earth system: Earth's early history; plate tectonics, continental drift, and climate changes during the past billion years; mountain building, ice ages, and our own emergence during the past ten million years. Serves as an introduction to methods of interpreting information preserved in the rock record.

EAS 315 Geomorphology (I)
Fall. 4 credits. Prerequisite: a 3-credit EAS course. T. E. Jordan and B. L. Isacks.
A study of the processes that sculpt the Earth's landscapes (above and below sea level) and the nature of those landforms. Landforms constructed by Earth's internal processes are the point of departure as we examine their modification by physical interaction with the atmosphere and oceans. Also treated are depositional landforms that are generated by accumulations of grains or sediment. Laboratory exercises include both field examination of landforms of the Finger Lakes area and computer analysis of satellite images and Digital Elevation Models of examples from around the globe. Includes two Saturday field trips.

EAS 321 Introduction to Biogeochemistry (also NTRES 321) (I)
Fall. 4 credits. Prerequisites: CHEM 207, MATH 112, plus a course in biology and/or geology. L. A. Derry, J. Yavitt.
Control and function of the Earth's global biogeochemical cycles. The course begins with a review of the basic inorganic and organic chemistry of biologically significant elements, and then considers the biogeochemical cycling of carbon, nutrients, and metals that take place in soil, sediments, rivers, and the oceans. Topics include weathering, acid-base chemistry, biological redox processes, nutrient cycling, trace gas fluxes, bio-active metals, the use of isotopic tracers, and mathematical models. Interactions between global biogeochemical cycles and other components of the Earth system are discussed.

EAS 326 Structural Geology (I)
Spring. 4 credits. Prerequisite: MATH 112, EAS 101 or 201, or permission of instructor. R. W. Allmendinger.
Nature and origin of deformed rocks at microscopic to macroscopic scales, with emphasis on structural geometry and kinematics. Topics include stress, strain, rheology, deformation mechanisms, minor structures, faulting, folding, and structural families.

EAS 331 Climate Dynamics (also ASTRO 331) (I)
Fall. 4 credits. Prerequisites: MATH 112 or 192 or equivalent. K. H. Cook, P. J. Gierasch.
Processes that determine climate and contribute to its change are discussed, including atmospheric radiation, ocean circulation, and atmospheric dynamics. Contemporary climate change issues are investigated and discussed in the context of natural variability of the system.

EAS 334 Microclimatology (I)
Spring. 3 credits. Prerequisite: a course in physics. Offered alternate years.
D. S. Wilks.
Considers the relationships of radiant energy, temperature, wind, and moisture in the atmosphere near the ground. The interplay between physical processes of the atmosphere, plant canopies, and soil is examined with emphasis on the energy balance.

EAS 341 Atmospheric Thermodynamics and Hydrostatics (I)
Fall. 3 credits. Prerequisites: 1 year of calculus and 1 semester of physics.
M. W. Wysocki.
Introduction to the thermodynamics and hydrostatics of the atmosphere and to the methods of description and quantitative analysis used in meteorology. Topics covered include thermodynamic processes of dry air, water vapor, and moist air and concepts of hydrostatics and stability.

EAS 342 Atmospheric Dynamics (I)
Spring. 3 credits. Prerequisites: 1 year each of calculus and physics. K. H. Cook and P. J. Gierasch.
Introduction to atmospheric dynamics and to the methods of description and quantitative analysis used in meteorology. Topics

considered include equations of atmospheric motion, motion in the free atmosphere, vertical variations of wind and pressure fields, mathematical representation and characteristics of fronts, mechanisms of pressure change, concepts of circulation and vorticity, and effects of friction on atmospheric motion.

EAS 352 Synoptic Meteorology (I)
Spring. 3 credits. Prerequisites: EAS 341 and concurrent enrollment in EAS 342. M. W. Wysocki.
Weather map analysis and forecasting techniques are studied by applying the principles of fluid and heat flow. This course strengthens previously introduced meteorological concepts which are applied to forecasting midlatitude synoptic scale weather systems, such as cyclones, anticyclones, jet streams, fronts, and waves.

EAS 355 Mineralogy (I)
Fall. 4 credits. Prerequisites: EAS 101 or 201 and CHEM 207 or permission of instructor. S. Mahlburg Kay.
The course covers chemical and physical properties and identification of minerals with emphasis on the rock forming minerals that are the principal constituents of the Earth and other planets. Topics include internal and external crystallography, crystal chemistry, introductions to x-ray crystallography and optical mineralogy, and a systematic examination of the structures, chemistry, and occurrence of the rock forming minerals. Independent project includes use of electron microprobe and x-ray facilities.

EAS 356 Petrology and Geochemistry (I)
Spring. 4 credits. Prerequisite: EAS 355. R. W. Kay.
Principles of phase equilibrium as applied to igneous and metamorphic systems. Description, classification, chemistry, origin, regional distribution, and dating of igneous and metamorphic rocks. Geochemical distribution of trace elements and isotopes in igneous and metamorphic systems. The petrological evolution of the planets.

EAS 375 Sedimentology and Stratigraphy (I)
Fall. 4 credits. Prerequisite: EAS 101 or 201. J. L. Cisne.
Course covers: the formation of sedimentary rocks; depositional processes and environments; correlation of strata in relation to time and environment; petrology of sandstone and limestone; geological age determination; reconstruction of paleogeography and interpretation of earth history from stratigraphic evidence; and organization of strata in stratigraphic sequences.

EAS 388 Geophysics and Geotectonics (I)
Spring. 4 credits. Prerequisites: MATH 192 (or 112) and PHYS 208 or 213. B. L. Isacks.
Covers global tectonics and the deep structure of the solid earth as revealed by investigations of earthquakes, earthquake waves, the earth's gravitational and magnetic fields, and heat flow.

EAS 417 Field Mapping in Argentina (I)
Summer. 3 credits. Prerequisites: EAS 210 and 326; Spanish desirable, but not required. S. Mahlburg Kay.
Covers modern techniques of geological mapping applied in the region of San Juan, Argentina, including folded and faulted sedimentary rock units of the Andean Precordillera (San Juan River section), intensely deformed Precambrian metamorphic rocks of the Pampean Ranges (Pie de Palo), and shallow-level silicic intrusives (Cerro Blanco-Ullun).

EAS 434 Reflection Seismology (I)
Spring. 4 credits. Prerequisites: MATH 192 and PHYS 208, 213, or equivalent. L. D. Brown.
Fundamentals of subsurface imaging by multichannel seismic reflection techniques as used in oil exploration and geohydrological investigations. Covers survey design, acquisition, analysis, processing, and interpretation in both 2-D and 3-D. Includes discussion of related techniques such as seismic refraction analysis, tomographic inversion, vertical seismic profiling, shear wave exploration, and ground penetrating radar. Lab is keyed to state-of-the-art seismic processing, modeling and interpretation software from LandMark.

EAS 435 Statistical Methods in Meteorology and Climatology (I)
Fall. 3 credits. Prerequisites: an introductory course in statistics (e.g., AEM 210) and calculus. D. S. Wilks.
Covers: statistical methods used in climatology, operational weather forecasting, and selected meteorological research applications; some statistical characteristics of meteorological data, including probability distributions and correlation structures; operational forecasts derived from multiple regression models, including the MOS system; forecast verification techniques and scoring rules; and time series analysis, EOFs, and other research topics as time permits.

EAS 437 Geophysical Field Methods (I)
Fall. 3 credits. Prerequisite: PHYS 213 or 208, or permission of instructor. L. D. Brown.
Introduction to field methods of geophysical exploration, especially as applied to environmental issues. Emphasis is on seismic, ground penetrating radar, gravity, and magnetic techniques. Field surveys carried out at the beginning of the semester are analyzed and interpreted.

EAS 447 Physical Meteorology (I)
Fall. 3 credits. Prerequisites: 1 year each of calculus and physics. Offered alternate years. A. T. DeGaetano.
Primarily a survey of natural phenomena of the atmosphere, with emphasis on their underlying physical principles. Topics include composition and structure of the atmosphere, atmospheric optics, acoustics and electricity, solar and terrestrial radiation, and principles of radar probing of the atmosphere.

EAS 451 Synoptic Meteorology II (I)
Fall. 3 credits. Prerequisites: EAS 341 and 342. S. J. Colucci.
Structure and dynamics of large-scale, midlatitude weather systems, such as cyclones, anticyclones, and waves, with consideration of processes that contribute to temperature changes and precipitation are covered. Laboratory sessions involve real-time weather forecasting and the computer application of a numerical model of the atmosphere to study selected large-scale, mid-latitude weather events.

[EAS 453 Advanced Petrology (I)
Fall. 3 credits. Prerequisite: EAS 356. Offered alternate years. Not offered 2001–2002. R. W. Kay.
Course topics include: magmas and metamorphism in the context of plate tectonics; major and trace element chemistry and phase petrology as monitors of the creation and modification of igneous rocks; and temperature and stress in the crust and mantle and their influence on reaction rates and textures of metamorphic rocks. Application of experimental studies to natural systems.]

EAS 454 Advanced Mineralogy (I)
Spring. 3 credits. Prerequisite: EAS 355 or permission of instructor. Offered alternate years. S. Mahlburg Kay.
Course covers: crystallography and crystal chemistry of minerals and the methods of their study. Includes X-ray diffraction, optical methods, computer simulation of crystal structures. Emphasis is on effects of high pressures and temperatures with implications for understanding the Earth's interior.

EAS 455 Geochemistry (I)
Fall. 4 credits. Prerequisites: CHEM 207 and MATH 192 or equivalent. Recommended: EAS 356. Offered alternate years. W. M. White.
Looks at the Earth from a chemical perspective. Covers: the formation of the elements; cosmochemistry; chemical evidence regarding the formation of the Earth and solar system; trace-element geochemistry; isotope geochemistry; geochemical thermodynamics and kinetics; chemical evolution of the crust, mantle, and core; weathering and the chemistry of natural waters; chemistry of rivers and the oceans; hydrothermal systems and ore deposition.

EAS 456 Mesoscale Meteorology (I)
Spring. 3 credits. Prerequisites: EAS 341 and 342 or permission of instructor. Offered alternate years. S. J. Colucci.
Covers the structure and dynamics of midlatitude mesoscale weather systems such as fronts, jets, squall lines, convective complexes, precipitation bands, downslope windstorms, mountain breezes, sea breeze circulations, and lake effect snowstorms.

[EAS 457 Atmospheric Air Pollution (I)
Fall. 3 credits. Prerequisites: EAS 341 or 1 course in thermodynamics, and 1 semester of chemistry, or permission of instructor. Offered alternate years; not offered 2001–2002. M. W. Wysocki.
Course examines sources, effects, transport, measurement, and controls of air pollution. The basic principles in each area are discussed with an emphasis on their local, regional, and global impacts.]

EAS 458 Volcanology (I)
Spring. 3 credits. Corequisite: EAS 356 or equivalent. Offered alternate years. R. W. Kay and W. M. White.
Considers the causes of volcanism, melting in the Earth, and the origin of magmas. Topics include: physical volcanology, nature and types of volcanic eruptions and associated deposits, eruption mechanisms; volcanic plumbing systems, magma chamber processes, evolution of magma; volcanism and impact phenomena in the solar system; volcanic hazard assessment and volcano monitoring; and ore deposits associated with volcanism.

[EAS 462 Marine Ecology (also BIOEE 462) (I)
Spring. 3 credits. Limited to 75 students. Prerequisite: BIOEE 261. Offered alternate years. Not offered 2001–2002. C. D. Harvell, C. H. Greene.
Lectures and discussion focus on current research in broad areas of marine ecology with an emphasis on processes unique to marine systems. A synthetic treatment of multiple levels of organization in marine systems including organismal, population, community, ecosystems, and evolutionary biology. Examples are drawn from all types of marine habitats including polar seas, temperate coastal waters, and tropical coral reefs.]

EAS 475 Special Topics in Oceanography
Spring, summer. 2–5 var. credits. Prerequisites: EAS 104 or BIOEE 154, and permission of instructor. C. H. Greene.
Undergraduate instruction and participation in advanced areas of oceanographic research. Topics change from term to term. Contact instructor for further information.

[EAS 476 Sedimentary Basins: Tectonics and Mechanics (I)
Fall. 3 credits. Prerequisite: EAS 375 or permission of instructor. Offered alternte years. Not offered 2001–2002. T. E. Jordan.
Covers subsidence of sedimentary basins from the point of view of plate tectonics and geomechanics. Topics include: interactions of subsidence, sediment supply, and environmental characteristics in development of stratigraphic sequences; stratigraphic characteristics of active-margin, passive-margin, and cratonic basins; and geophysical and stratigraphic modeling; sequence stratigraphy. Modern and ancient examples are used.]

EAS 478 Advanced Stratigraphy (I)
Fall. 3 credits. Prerequisite: EAS 375 or permission of instructor. Offered alternate years. T. E. Jordan.
Modern improvements on traditional methods of the study of ages and genetic relations among sedimentary rocks, emphasizing 3-D relationships. Techniques and applications of sequence stratigraphy at scales ranging from beds to entire basins. Physical correlation, dating techniques, and time resolution in sedimentary rocks. Physical controls on the stratigraphic record. Numerical modeling.

EAS 479 Paleobiology (also BIOEES 479) (I)
Fall. 4 credits. Prerequisites: 1 year of introductory biology for majors and either BIOEE 274, 373, EAS 375, or permission of instructor. W. Allmon.
A survey of the major groups of organisms and their evolutionary histories. Intended to fill out the biological backgrounds of earth and atmospheric sciences students concerning the nature and significance of the fossil record for their respective studies.

EAS 481 Senior Survey of Earth Systems (I)
Fall. 3 credits. Limited to seniors majoring in geological science. J. M. Bird.
Survey course that integrates undergraduate course work, intended to enhance overall understanding of geological sciences. Emphasis on current models of earth's dynamic systems (e.g., global climate change; mantle evolution). Includes guest lecturers; synthesis and review literature; scientific literature readings; discussions; student presentations.

[EAS 483 Environmental Biophysics (also CSS 483) (I)
Spring. 3 credits. Prerequisites: EAS/CSS 260 or equivalent, or permission of instructor. Offered alternate years. Not offered 2001–2002. S. J. Riha.
Introduction to basic principles of energy and mass transfer and storage in soil-plant systems. Topics include: energy budgets, soil heat flow, water movement in saturated and unsaturated soils, evapotranspiration, water, gas, and nutrient dynamics in the soil-plant-atmosphere continuum. Applications to agronomic and environmental problems and instrument design and use are considered through discussion and problem sets.]

EAS 491–492 Undergraduate Research
Fall, spring. 1–4 credits. Staff. (R. W. Kay, coordinator.)
Introduction to the techniques and philosophy of research in the earth sciences and an opportunity for undergraduates to participate in current staff research projects. Topics chosen in consultation with, and guided by, a staff member. A short written report is required, and outstanding projects are prepared for publication.

EAS 496 Internship experience
Fall or spring. 1–2 credits. S-U grades only.

EAS 497 Individual Study in Atmospheric Science
Fall or spring. 1–6 credits. S-U grades optional. Students must register with an Independent Study form.
Topics are arranged at the beginning of the term for individual study or for group discussions.

EAS 498 Teaching Experience in Atmospheric Science
Fall or spring. 1–5 credits. S-U grades optional. Students must register with an Independent Study form.
Teaching experience is obtained by assisting in the instruction of an atmospheric science course.

EAS 499 Undergraduate Research in Atmospheric Science
Fall or spring. Credit by arrangement. Students must register with an Independent Study form.
Independent research on current problems in atmospheric science.

EAS 500 Design Project in Geohydrology
Fall, spring. 3–12 credits. An alternative to an industrial project for M.Eng. students choosing the geohydrology option. May continue over 2 or more semesters. L. M. Cathles.
The project may address one of the many aspects of groundwater flow and contamination and must involve a significant geological component and lead to concrete recommendations or conclusions of an engineering nature. Results are presented orally and in a professional report.

EAS 502 Case Histories in Groundwater Analysis
Spring. 4 credits. L. M. Cathles.
Groundwater flow in a specific area, such as a proposed nuclear-waste disposal site, is analyzed in depth. Geological and resource data on the area are presented early in the course. Then the material is analyzed by students working as an engineering analysis team. Each student makes a weekly progress report and writes part of a final report. Results are presented in a half-day seminar at the end of term.

EAS 622 Advanced Structural Geology I
Spring. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years. R. W. Allmendinger.
Stress-strain theory and application. Advanced techniques of structural analysis. Topics include finite and incremental strain measurement; microstructure, preferred orientation, and TEM analysis; pressure solution and cleavage development; and experimental deformation. Applications to deformation of unconsolidated sediments, brittle and brittle-ductile deformation of supracrustal strata, and ductile deformation of high-grade metamorphic rocks. Kinematic analysis of shear zones and folds in these regimes.

[EAS 624 Advanced Structural Geology II
Spring. 3 credits. Prerequisites: EAS 326 and permission of instructor. Offered alternate years. Not offered 2001–2002. R. W. Allmendinger.
Geometry, kinematics, and mechanics of structural provinces. Concentration on thrust belts, rift provinces, or strike-slip provinces. Techniques of balanced cross sections.]

EAS 628 Geology of Orogenic Belts
Spring. 3 credits. Prerequisite: permission of instructor. J. M. Bird.
A seminar course in which students study specific geologic topics of an orogenic belt selected for study during the term. The course is intended to complement EAS 681.

[EAS 634 Advanced Geophysics I: Fractals and Chaos in Geology and Geophysics
Spring. 3 credits. Prerequisite: EAS 388 or permission of instructor. Offered alternate years. Next offered 2002–2003. D. L. Turcotte.
Topics include: definitions of fractal sets and statistical fractals, scale invariance, self-affine fractals, multifractals, applications to fragmentation, seismicity and tectonics, petroleum distribution and reserves, ore grade and tonnage, drainage networks and landforms, and floods and droughts. Definitions of chaos and self-organized criticality, renormalization groups, diffusion limited aggregation and percolation clusters, wavelet transforms, applications to mantle convection, the earth's dynamo, and distributed seismicity.]

EAS 635 Advanced Statistical Meteorology and Climatology
Fall. 3 credits. Prerequisites: coursework in or elementary knowledge of statistics, calculus, matrix algebra, and computer programming. D. S. Wilks.
Lectures and topics concurrent with EAS 435, plus an extra 40-minute session per week in which selected topics from EAS 435 are treated in more depth and additional topics are covered which may vary from year to year according to student interest. Term project required. Not open to students who have taken EAS 435 for credit.

[EAS 636 Advanced Geophysics II: Quantitative Geodynamics
Spring. 3 credits. Prerequisite: EAS 388 or permission of instructor. Offered alternate years. Next offered 2003–2004. D. L. Turcotte.

Stress and strain in the earth, elasticity and flexure, heat transfer, gravity, fluid mechanics, rock rheology, faulting, chemical geodynamics, flow in porous media.]

[EAS 641 Analysis of Biogeochemical Systems
Spring. 3 credits. Prerequisite: MATH 293 or permission of instructor. Offered alternate years. Not offered 2001–2002. L. A. Derry.
Dynamics of biogeochemical systems. Kinetic treatment of biogeochemical cycles. Box models, residence time, response time. Analytical and numerical solutions of model systems. Eigen-analysis of linear systems. Feedback and nonlinear cases, problems of uncertainties in natural systems. Modeling software such as Stella II and Matlab; applications to current research of participants or from recent literature.]

[EAS 651 Atmospheric Physics (also ASTRO 651)
Fall. 3 credits. Prerequisite: a good background in undergraduate calculus and physics is required. Offered alternate years. Not offered 2001–2002. K. H. Cook, P. J. Gierasch, S. J. Colucci.
A survey of the fundamental physical processes in atmospheres. Topics include thermodynamics of atmospheric gases, moist effects, hydrostatics, convective instability, atmospheric radiation and radiative heating, radiative-convective equilibrium, clouds, cloud microphysics, and precipitation processes. Thermal structure and greenhouse effects on the Earth and other planets are discussed. The course is taught at the level of *Fundamentals of Atmospheric Physics* by Salby.]

[EAS 652 Advanced Atmospheric Dynamics (also ASTRO 652)
Spring. 3 credits. Prerequisites: EAS 341 and 342 or permission of instructor. Offered alternate years. Not offered 2001–2002. S. J. Colucci, K. H. Cook, P. J. Gierasch.
Course topics include: quasigeostrophic theory, atmospheric waves, hydrodynamic instability, the general circulation of the atmosphere, and topics selected from among numerical weather prediction and tropical, mesoscale, and middle atmosphere processes according to student interest.]

EAS 656 Isotope Geochemistry
Spring. 3 credits. Open to undergraduates. Prerequisite: EAS 455 or permission of instructor. Offered alternate years. W. M. White.
Course topics include: nucleosynthetic processes and the isotopic abundances of the elements; geochronology and cosmochronology using radioactive decay schemes, including U-Pb, Rb-Sr, Sm-Nd, K-Ar, U-series isotopes, and cosmogenic isotopes such as ^{14}C and ^{36}Cl; use of radiogenic and stable isotopes in petrology and their application to study of the evolution of the crust and mantle; isotopic evidence regarding the formation of the Earth and the solar system; and stable isotopes and their use in geothermometry, ore petrogenesis, paleontology, and the global climate system.

EAS 675 Modeling the Soil-Plant-Atmosphere System (also CSS 675)
Spring. 3 credits. Prerequisites: EAS/CSS 483 or equivalent. Offered alternate years. S. J. Riha.
Introduction to the structure and use of soil-plant-atmosphere models. Topics covered include modeling plant physiology, morphology, and development; potential crop production and crop production limited by moisture and nutrient availability; plant-plant competition; and land surface processes as well as model data requirements, validation, and scale. Use of soil-plant-atmosphere models for teaching, research, extension, and policy formation is discussed.

EAS 692 Special Topics in Atmospheric Science
Fall or spring. 1–6 credits. S-U grades optional.
Study of topics in atmospheric science that are more specialized or different from other courses. Special topics covered depend on staff and student interests.

EAS 695 Computer Methods in Geological Sciences
Fall, spring. 3 credits. L. Brown, B. L. Isacks.
Independent research projects using state-of-the-art computational resources in the Department of Earth and Atmospheric Sciences. Possibilities include image and seismic processing, seismic and geomechanical modeling, GIS, use of interpretational workshops for 3-D seismic and satellite imagery, modeling fluid flow through complex media.

EAS 700–799 Seminars and Special Work
Fall, spring. 1–3 credits. Prerequisite: permission of instructor. Staff.
Advanced work on original investigations in earth and atmospheric sciences. Topics change from term to term. Contact appropriate professor for more information.

EAS 722 Advanced Topics in Structural Geology
R. W. Allmendinger.

EAS 731 Plate Tectonics and Geology
J. M. Bird.

[EAS 733 Fractals and Chaos—Independent Studies
Not offered 2001–2002. D. L. Turcotte.]

EAS 751 Petrology and Geochemistry
R. W. Kay.

EAS 755 Advanced Topics in Petrology and Tectonics
J. M. Bird.

EAS 757 Current Research in Petrology and Geochemistry
S. Mahlburg Kay.

EAS 762 Advanced Topics in Paleobiology
W. D. Allmon.

EAS 771 Advanced Topics in Sedimentology and Stratigraphy
T. E. Jordan.

EAS 773 Paleobiology
J. L. Cisne.

EAS 775 Advanced Topics in Oceanography
Spring. C. H. Greene.

EAS 780 Earthquake Record Reading
Fall. M. Barazangi.

EAS 781 Geophysics, Exploration Seismology
L. D. Brown.

EAS 783 Advanced Topics in Geophysics
B. L. Isacks.

EAS 789 Lithospheric Seismology Seminar
L. D. Brown.

EAS 793 Andes-Himalayas Seminar
S. Mahlburg Kay, R. W. Allmendinger, B. L. Isacks, T. E. Jordan.

EAS 795 Low Temperature Geochemistry
Spring. L. A. Derry.

EAS 796 Geochemistry of the Solid Earth
W. M. White.

EAS 797 Fluid-Rock Interactions
L. M. Cathles.

EAS 799 Soil, Water, and Geology Seminar
L. M. Cathles, T. S. Steenhuis.

EAS 850 Master's-Level Thesis Research in Atmospheric Science
Fall or spring. Credit by arrangement. S-U grades only. Hours by arrangement. Graduate faculty.
Limited to students specifically in the master's program in atmospheric science.

EAS 950 Graduate-Level Dissertation Research in Atmospheric Science
Fall or spring. Credit by arrangement. S-U grades optional. Hours by arrangement. Graduate faculty.
Limited to students in the atmospheric science Ph.D. program *only before* the "A" exam has been passed.

EAS 951 Doctoral-Level Dissertation Research in Atmospheric Science
Fall or spring. Credit by arrangement. S-U grades optional. Hours by arrangement. Graduate faculty.
Limited to students admitted to candidacy in the atmospheric science Ph.D. program *after* the "A" exam has been passed.

ECONOMICS

T. Mitra, chair; R. Masson, graduate field representative; G. Staller, director of undergraduate studies; K. Basu, L. Blume, R. Burkhauser, S. Coate, T. E. Davis, D. Easley, R. Ehrenberg, G. Fields, R. Frank, G. Hay, Y. Hong, R. Kanbur, N. Kiefer, T. Lyons, P. D. McClelland, M. Majumdar, O. Melnikov, T. O'Donoghue, S. Ortigueira, K. Park, U. Possen, A. Razin, R. E. Schuler, K. Shell, S. Subramanian, M. Urquiola, T. Vogelsang, H. Y. Wan, Jr., Y. Wen, J. Wissink. Emeritus: W. Isard, A. Kahn, E. Thorbecke, J. Vanek

The study of economics provides an understanding of the way economies operate and an insight into public issues. The department offers a broad range of undergraduate courses in such fields as money and banking; international and comparative economics; econometrics; theory; history; growth and development; and the organization, performance, and control of industry.

Social Science Distribution Requirement

The microeconomics distribution requirement can be fulfilled with any of the following:
ECON 101, ECON 301, or ECON 313.

The macroeconomics distribution requirement can be satisfied with any of the following:

ECON 102, ECON 302, or ECON 314.

The Major

Prerequisites

ECON 101 and 102 and MATH 111 (or equivalents, with approval of the director of undergraduate studies), all with grades of C or better.

ECON 301 with a grade of C or better substitutes for 101; ECON 302 with a grade of C or better substitutes for 102.

Requirements

Eight courses listed by the Department of Economics at the 300 level or above, or approved by the student's major adviser, all with grades of C- or better. (S-U grade option is not allowed.)

These eight courses must include:

(1) ECON 313 and 314

(2) ECON 321, or ECON 319 and 320

(3) at least three courses from the following: 318, 320, 322–99, 467

ECON 301 with a grade of B or better substitutes for both 101 and 313; ECON 302 with a grade of B or better substitutes for both 102 and 314.

If ECON 321 is applied toward the major, neither 319 nor 320 can be applied.

ECON 498 and 499 *cannot* be counted toward the eight-course requirement.

If ECON 313 is applied to the major, ECON 301 cannot be.

If ECON 314 is applied to the major, ECON 302 cannot be.

An honors program is currently being offered. Students should consult the director of undergraduate studies before May of their junior year for more information.

Students planning graduate work in Economics should select ECON 319–320 rather than 321 and should consider including some of the following courses in their majors:

ECON 317–318, Mathematical Economics

ECON 416, Intertemporal Economics

ECON 419, Economic Decisions under Uncertainty

ECON 445–446, Topics in Microeconomic and Macroeconomic Analysis

ECON 467, Game Theory.

Students planing careers in business management should consider including some of the following courses in their majors:

ECON 333, Financial Economics

ECON 351 or 352, Industrial Organization

ECON 361–362, International Trade and Finance

ECON 440–41, Analysis of Agricultural Markets and Commodity Futures Markets.

ECON 443, Personnel Economics for Managers

In addition to completing the Economics major, such students should also consider courses in accounting and subjects such as finance, marketing, entrepreneurship, business administration, and business law. Courses in these subjects are offered by the Department of Applied Economics and Management; the School of Hotel Administration; and the Johnson Graduate School of Management.

Students planning to attend Law School should consider including some of the following courses in their majors:

ECON 351 or 352, Industrial Organization

ECON 361–362, International Trade and Finance

ECON 404, Economics and the Law.

In addition to completing the Economics major, such students should inquire at Career Services, College of Arts and Sciences, concerning recommended courses offered by other departments.

Courses

ECON 101 Introductory Microeconomics (III)
Fall, spring, winter, and summer. 3 credits. ECON 101 is not a prerequisite for 102.
Explanation and evaluation of how the price system operates in determining what goods are produced, how goods are produced, who receives income, and how the price system is modified and influenced by private organizations and government policy.

ECON 102 Introductory Macroeconomics (III)
Fall, spring, winter, and summer. 3 credits. ECON 101 is not a prerequisite for 102.
Analysis of aggregate economic activity in relation to the level, stability, and growth of national income. Topics discussed may include the determination and effects of unemployment, inflation, balance of payments, deficits, and economic development, and how these may be influenced by monetary, fiscal, and other policies.

ECON 230 International Trade and Finance (III)
For description, see AEM 230.

ECON 301 Microeconomics (III)
Fall. 4 credits. Prerequisite: calculus.
Intended for students with strong analytical skills who have not taken ECON 101, 102. Can be used to replace both ECON 101 and 313. (Can replace 313 only with grade of B or better.) This course covers the topics taught in ECON 101 and 313. An introduction to the theory of consumer and producer behavior and to the functioning of the price system.

ECON 302 Macroeconomics (III)
Spring. 4 credits. Prerequisite: ECON 301.
Intended for students with strong analytical skills who have not taken ECON 101, 102. Can be used to replace both ECON 102 and 314. This course covers the topics taught in ECON 102 and 314. (Can replace 314 only with grade of B or better.) An introduction to the theory of national income determination, unemployment, growth, and inflation.

ECON 307 Introduction to Peace Science (also CRP 495.18) (III)
Winter session. 4 credits. Prerequisites: ECON 101–102 or permission of instructor.
Introduction to the theories of and research on conflict resolution. Topics include conflict, its role and impact on society; theories of aggression and altruism; causes of war; game theory; conflict management procedures and other analytical tools and methods of peace science; and alternatives to war.

ECON 313 Intermediate Microeconomic Theory (III)
Fall, spring, and summer. 4 credits.
Prerequisites: ECON 101–102 and calculus.
The pricing processes in a private enterprise economy are analyzed under varying competitive conditions, and their role in the allocation of resources and the functional distribution of national income is considered.

ECON 314 Intermediate Macroeconomic Theory (III)
Fall, spring, and summer. 4 credits.
Prerequisites: ECON 101–102 and calculus.
The theory of national income and determination and economic growth in alternative models of the national economy is introduced. The interaction and relation of these models to empirical aggregate economic data is examined.

ECON 319 Introduction to Statistics and Probability (II)
Fall. 4 credits. Prerequisites: ECON 101–102 and MATH 111–112.
This course provides an introduction to statistical inference and to principles of probability. It includes descriptive statistics, principles of probability, discrete and continuous distributions, and hypothesis testing (of sample means, proportions, variance). Regression analysis and correlation are introduced.

ECON 320 Introduction to Econometrics (II)
Spring. 4 credits. Prerequisites: ECON 101–102, 319, or equivalent.
Introduction to the theory and application of econometric techniques. How econometric models are formulated, estimated, used to test hypotheses, and used to forecast; understanding economists' results in studies using regression model, multiple regression model, and introduction to simultaneous equation models.

ECON 321 Applied Econometrics (II)
Fall and spring. 4 credits. Prerequisites: ECON 101–102 and calculus.
This course provides an introduction to statistical methods and principles of probability. Topics covered include analysis of data, probability concepts and distributions, estimation and hypothesis testing, regression, correlation and time series analysis. Applications from economics are used to illustrate the methods covered in the course.

ECON 322 World Economic History # (III)
Spring. 4 credits. Prerequisites: ECON 101 and 102 or the equivalent.
An economist's perspective on the comparative evolution of selected economic and social institutions, with emphasis on trade, finance, population growth and technological change.

ECON 323 American Economic History # (III)
Fall. 4 credits. Prerequisites: ECON 101–102 or equivalent.
Problems in American economic history from the first settlements to early industrialization are surveyed.

ECON 324 American Economic History # (III)
Spring. 4 credits. Prerequisites: ECON 101–102 or equivalent.
A survey of problems in American economic history from the Civil War to World War I.

ECON 331 Money and Credit (III)
Fall. 4 credits. Prerequisites: ECON 101–102 and 314.
A systematic treatment of the determinants of the money supply and the volume of credit. Economic analysis of credit markets and financial institutions in the United States.

ECON 333 Financial Economics (III)
Spring. 4 credits. Prerequisites: ECON 313 and 314.
The theory and decision making in the presence of uncertainty and the practical aspects of particular asset markets are examined.

ECON 335 Public Finance: The Microeconomics of Government (III)
Fall. 4 credits. Prerequisites: ECON 101–102 and 313, or their equivalent, and one semester of calculus.
The role of government in a free market economy is analyzed. Topics covered include public goods, market failures, allocation mechanisms, optimal taxation, effects of taxation, and benefit-cost analysis. Current topics of an applied nature vary from term to term.

ECON 336 Public Finance: Resource Allocation and Fiscal Policy (III)
Spring. 4 credits. Prerequisites: ECON 101–102, 313 or their equivalent and 1 semester of calculus.
This course covers the revenue side of public finance and special topics. Subjects covered include the federal debt, the budget, and government regulation and transfers, as well as problems like local public goods, health care, education, the hierarchy of governmental structure, plus a variety of applied problems.

ECON 341 Labor Economics (III)
For description, see ILRLE 240.

ECON 351 Industrial Organization I (III)
Fall. 4 credits. Prerequisite: ECON 313 or its equivalent.
This course examines markets with only a few firms (i.e., oligopolies), and the primary focus is the strategic interactions between firms. Topics include static competition in oligopolies, cartels and other forms of collusive behavior, competition between firms producing differentiated products, entry behavior, R&D behavior, and government interventions in oligopoly industries (e.g., antitrust laws).

ECON 352 Industrial Organization II (III)
Spring. 4 credits. Prerequisite: ECON 313 or its equivalent.
This course primarily focuses on the pricing decisions of firms. The course does not consider the strategic response of other firms to these pricing decisions. The pricing decisions include price discrimination, commodity bundling, pricing a product line and pricing a durable good. In addition to pricing decisions, the course considers topics associated with private information such as adverse selection, signaling, and moral hazard. Numerous theoretical models are presented and empirical results are discussed.

ECON 361 International Trade Theory and Policy (III)
Fall. 4 credits. Prerequisites: ECON 101–102 and 313.
This course surveys the sources of comparative advantage. It studies commerical policy and analyzes the welfare economics of trade between countries. Some attention is paid to the institutional aspects of the world trading system.

ECON 362 International Monetary Theory and Policy (III)
Spring and summer. 4 credits. Prerequisites: ECON 101–102 and 314.
This course surveys the determination of exchange rates and theories of balance of payments adjustments. It also explores open economy macroeconomics, and it analyzes some of the institutional details of foreign exchange markets, balance of payments accounting, and the international monetary system.

ECON 367 Game Theoretic Methods (III)
Fall, spring. 4 credits. Prerequisites: ECON 101 or equivalent.
This course introduces students to the use of game-theoretic methods for the social sciences. This leads to an analysis of the social and political foundations of economics which prepares students to think strategically on social and economic matters and thus serve as a background for more advanced courses in economics, game theory, and related social sciences.

ECON 371 Economic Development (III)
Fall. 4 credits. Prerequisites: ECON 313 or equivalent.
Study of the problem of sustaining accelerated economic growth in less-developed countries. Trade-offs between growth, welfare, and equity; the legacy of colonialism; relevance of history and economic theory; problems of capital formation, economic planning and international specialization; and the interaction of industrialization, agricultural development, and population change are emphasized.

ECON 372 Applied Economic Development (III)
Spring. 4 credits. Prerequisite: ECON 101–102.
This course examines several special topics in the economics of developing countries. Among the topics covered recently are the concepts of development and underdevelopment, the debate over development economics, the peasant household and its place in the world economy, the debt crisis, the state vs. market debate and the role of the state in economic development, and the question of sustainable development.

ECON 404 Economics and the Law (III)
Fall. 4 credits. Prerequisite: ECON 101.
An examination, through the lens of economic analysis, of legal principles drawn from various branches of law, including contracts, torts, and property. Cases are assigned for class discussion; in addition, there are several writing assignments.

ECON 408 Production Economics and Policy (III)
For description, see AEM 608.

ECON 409 Environmental Economics and Policy (III)
For description, see AEM 451.

ECON 415 Price Analysis (III)
For description, see AEM 415.

[ECON 416 Intertemporal Economics (III)
Spring. 4 credits. Prerequisites: ECON 313. Not offered 2001–2002.
This course is intended for advanced economics majors who are especially interested in economic theory. Topics covered: (1) review of the one good Ramsey model of optimal savings and accumulation; conditions for intertemporal efficiency in production; comparative dynamics and sensitivity analysis; (2) some earlier models of capital accumulation; the roles of present value and internal rate of return in guiding investment decisions; (3) growth, exhaustible resources; pollution and conservation: discussion of the trade-offs facing a society.]

ECON 417 History of Economic Analysis # (III)
Fall or spring. 4 credits. Prerequisites: ECON 101–102 or permission of instructor.
Covers early writings in economics and their relationship to current economic analysis and policy issues. Examples includle: ancient and medieval philosophers on justice in exchange; mercantilist arguments for trade protection; early theories about the effect of monetary expansion (D. Hume); the role of the entrepreneur (Cantillon); and general competitive equilibrium (the Physiocrats). The most recent reading assignment in this course is Adam Smith's *Wealth of Nations* but the emphasis is on the relationship between the precursors of Adam Smith and his *Wealth of Nations* to modern economics analysis and current efforts to answer some of the questions raised in the early writing on economics.

[ECON 419 Economic Decisions under Uncertainty (III)
Fall. 4 credits. Prerequisites: ECON 313 and 319. Not offered 2001–2002.
This course provides an introduction to the theory of decision making under uncertainty with emphasis on economic applications of the theory.]

ECON 420 Economics of Family Policy—Adults
Economics 420 and 421 together, count as 1 course for the Economics major.
For description, see PAM 320.

ECON 421 Economics of Family Policy—Children
Economics 420 and 421 together, count as 1 course for the Economics major.
For description, see PAM 321.

ECON 425 Economic History of Latin America @ # (III)
Spring. 4 credits.
A survey of changing economic institutions and policies from pre-Columbian to modern times.

ECON 430 Policy Analysis: Welfare Theory, Agriculture, and Trade (III)
For description, see AEM 630.

ECON 440 Analysis of Agricultural Markets
ECON 440 and 441 together, count as 1 course for the Economics major.
For description, see AEM 640.

ECON 441 Commodity Futures Markets
ECON 440 and 441 together, count as 1 course for the Economics major.
For description, see AEM 641.

ECON 443 Personnel Economics for Managers
For description, see ILRLE 433.

ECON 444 Modern European Economic History
For description, see ILRLE 444.

[ECON 445 Topics in Microeconomic Analysis—Markets and Planning (III)
Fall. 4 credits. Prerequisites: ECON 313. Not offered 2001–2002.
This is a course of economic theory designed for upperclass undergraduates. Course contents may vary from year to year. Issues that may be examined include: How can economic activities be efficiently organized through the market mechanism? Why is the presence of many traders essential to efficiency? What can be done if the indivisibility in production processes becomes an important hindrance to competitive pricing? How can economic planning be decentralized efficiently? This course serves two purposes: to introduce concepts that are novel to undergraduates and relevant to public policy but require only a modicum of analytic tooling up, and to illustrate the deductive approach of modern economic analysis—how to define concepts unambiguously, how to form propositions in clear-cut fashion, and how to follow up logical implications sequentially to the conclusion.]

[ECON 446 Topics in Macroeconomic Analysis—Is Keynesianism Dead? (III)
Fall or spring. 4 credits. Prerequisites: ECON 314. Not offered 2001–2002.
The coverage of this course may vary from term to term. Presently, the content of the course deals with the range of criticisms against Keynesian theory by the New Classical Economics, alias the Equilibrium School, alias the Rational Expectations School. Despite the fact that almost all intermediate macroeconomic textbooks are Keynesian in perspective, clearly Keynesian economics is currently at bay. We review critically critiques to Keynesian theory.]

ECON 447 Economics of Social Security (III)
For description, see CEH 346.

ECON 450 Resource Economics (III)
For description, see ARME 450.

ECON 451 Economic Security (III)
For description, see ILRLE 340.

ECON 453 The Economics of Unemployment (III)
For description, see ILRLE 348.

ECON 454 The Economics of Health Care (III)
For description, see ILRLE 440.

ECON 455 Income Distribution (III)
For description, see ILRLE 441.

ECON 456 The Economics of Employee Benefits (III)
For description, see ILRLE 442.

ECON 457 Women in the Economy (III)
For description, see ILRLE 445.

ECON 458 Topics in Twentieth-Century Economic History (III)
For description, see ILRLE 448.

ECON 459 Economic History of British Labor 1750–1940 (III)
For description, see ILRLE 446.

ECON 460 Economic Analysis of the Welfare State (III)
For description, see ILRLE 642.

ECON 461 The Economics of Occupational Safety and Health (III)
For description, see ILRLE 644.

ECON 464 Economics of Agricultural Development (III)
For description, see AEM 464.

ECON 465 Food and Nutrition Policy (III)
For description, see AEM 665.

ECON 466 Economics of Development (III)
For description, see AEM 666.

ECON 467 Game Theory (III)
Fall. 4 credits. Prerequisites: ECON 313 and 319.
This course studies mathematical models of conflict and cooperation in situations of uncertainty (about nature and about decision makers).

ECON 468 Economic Problems of Latin America @ (III)
Spring. 4 credits. Prerequisites: ECON 101–102.
Current topics include, international debt, capital flight, economic integration, stabilization programs, etc.

ECON 469 China's Economy under Mao and Deng @ (III)
Fall. 4 credits. Prerequisites: ECON 101–102 or permission of instructor.
Examines the development of the Chinese economy and the evolution of China's economic system between 1949 and the early 1990s.

ECON 471 The Economies of the Former Soviet Union and of Central Europe: From Central Planning to Markets (III)
Fall. 4 credits. Prerequisites: ECON 101, 102.
The course introduces first the basic features of a centrally planned economy and proceeds to consider the most important example: the rise and fall of the Soviet Union. Secondly, the analysis extends to what used to be known as "Eastern Europe" (e.g., Czechoslovakia, Hungary, Poland). From this necessary historical background, the course proceeds to current attempts to move away from Socialist central planning and its legacies to market economy, privatization, and independence.

ECON 472 Comparative Economic Systems: East and West (III)
Fall. 4 credits. Prerequisites: ECON 101–102.
The course develops first a framework for studying economic systems and national economies and presents three simple stylized systemic models: capitalist market, socialist market, and central planning. Secondly, the course considers economic goals to be achieved (such as growth, stability, and productivity) and introduces quantitative measures used in the evaluation of the performance. Thirdly, comparative studies of selected national economies representing the models are carried out.

ECON 473 Economics of Export-Led Development @ (III)
Spring. 4 credits. Prerequisites: ECON 313, 314, or their equivalent.
This course examines the phenomenon of export-led development from both the theoretical and empirical points of view. Concentration is on experiences within the West Pacific Rim.

ECON 474 National and International Food Economics (III)
For description, see NS 457.

ECON 475 The Economy of India @ (III)
Fall. 4 credits. Prerequisite: ECON 101–102 or equivalent background.
This course presents the major economics and development problems of contemporary India and examines the country's future economic prospects. It is, however, our aim to discuss these problems in their proper historical perspectives. Hence, the course starts with a brief outline of the social and political history of India. It then turns to a more detailed account of the economic history of India in two stages.

ECON 498 Independent Study in Economics
Fall or spring. Variable credit.
Independent study.

ECON 499 Honors Program
Fall and spring. 8 credits. Prerequisites: ECON 313, 314, 321 (or 319–320).
Consult the Director of Undergraduate Studies for details. Interested students should apply to the program in the spring semester of their junior year.

Graduate Courses and Seminars

ECON 609 Microeconomic Theory I
Fall. 4 credits.
Topics in consumer and producer theory.

ECON 610 Microeconomic Theory II
Spring. 4 credits.
Topics in consumer and producer theory, equilibrium models and their application, externalities and public goods, intertemporal choice, simple dynamic models and resource depletion, choice under uncertainty.

ECON 613 Macroeconomic Theory I
Fall. 4 credits.
Course covers the following topics: static general equilibrium; intertemporal general equilibrium: infinitely lived agents models and overlapping generations models; welfare theorems; equivalence between sequential markets and Arrow-Debreu Markets; Ricardian proposition; Modigliani-Miller theorem; asset pricing; recursive competitive equilibrium; the Neoclassical Growth Model; calibration; and introduction to dynamic programming.

ECON 614 Macroeconomic Theory II
Spring. 4 credits.
Course covers the following topics: dynamic programming; stochastic growth; search models; cash-in-advance models; real business-cycle models; labor indivisibilities and lotteries; heterogeneous agents models; optimal fiscal and monetary policy; sustainable plans; and endogenous growth.

ECON 616 Applied Price Theory (also NBA 527)
Spring. 4 credits.
The course emphasizes the applications of the principles of price theory to a variety of problems taken from concrete, practical settings.

ECON 617 Intermediate Mathematical Economics I
Fall. 4 credits. Prerequisites: Calculus II and intermediate linear algebra.
The course covers selected topics in Matrix algebra (vector spaces, matrices, simultaneous linear equations, characteristic value problem), calculus of several variables (elementary real analysis, partial differentiation, convex analysis), classical optimization theory (unconstrained maximization, constrained maximization).

[ECON 618 Intermediate Mathematical Economics II
Spring. 4 credits. Not offered 2001–2002.
A continuation of ECON 617, the course develops additional mathematical techniques for applications in economics. Topics covered may include study of dynamic systems (linear and nonlinear difference equations, differential equation, chaotic behavior), dynamic optimization methods (optimal control theory, nonstochastic and stochastic dynamic programming), and game theory (repeated dynamic and evolutionary games).]

ECON 619 Econometrics I
Fall. 4 credits. Prerequisites: ECON 319–320 or permission of instructor.
This course gives the probabilistic and statistical background for meaningful application of econometric techniques. Topics covered include: probability theory: probability spaces, random variables, distributions, moments, transformations, conditional distributions, distribution theory and the multivariate normal distribution, convergence concepts, laws of large numbers, central limit theorems, Monte Carlo simulation; statistics: sample statistics, sufficiency, exponential families of distributions. Further topics in statistics are considered in ECON 620.

ECON 620 Econometrics II
Spring. 4 credits. Prerequisite: ECON 619.
This course is a continuation of ECON 619 (Econometrics I) covering statistics: estimation theory, least squares methods, method of maximum likelihood, generalized method of moments, theory of hypothesis testing, asymptotic test theory, and nonnested hypothesis testing; and econometrics: the general linear model, generalized least squares, specification tests, instrumental variables, dynamic regression models, linear simultaneous equation models, nonlinear models, and applications.

ECON 639 Public Political Economy
Spring. 4 credits. Prerequisites: ECON 313 or equivalent.
Topics covered include the intrinsic nature of goods and services, decreasing cost of production, externalities and congestion, attributes and government regulation essential for an effective market, the efficient role of government in non-market resource allocation methods, methods for inferring the demand for public goods, efficient public decision-making, the supply of public services and raising revenue through taxes and user-fees. Particular emphasis is placed on the intersection between fairness and efficiency in resolving conflicts over public good provision, including defining jurisdictions for the provision of particular services. Examples emphasize the proper provision of infrastructure services: physical (transportation, utilities, tele-information); human-capital (education and R&D); and biological (renewable resources, species diversity and the environment.

ECON 699 Readings In Economics
Fall or spring. Variable credit.
Independent study.

ECON 703 Seminar In Peace Science
Fall. 4 credits.
Among the topics covered at an advanced level are game theory are: coalition theory, bargaining and negotiation processes, cooperative procedures, microbehavior models, macrosocial processes, and general systems analysis.

ECON 710 Stochastic Economics: Concepts and Techniques
Spring. 4 credits. Prerequisites: ECON 609, 610, 613, 614, 619, and 620.
This course reviews a number of techniques that have been useful in developing stochastic models of economic behavior. These include: discrete-time Markov processes, dynamic programming under uncertainty, and continuous-time diffusion processes. Examples of economic models are drawn from recent literature on optimal capital accumulation and optimal savings and portfolio selection problems; permanent income hypothesis; dynamic models of price adjustment, etc. Advanced graduate students contemplating work in economic theory and econometric theory gain exposure to current research.

ECON 712 Advanced Macroeconomics
4 credits. Prerequisites: ECON 613, 614.
The purpose of this course is to introduce students to some of the topics and analytic techniques of current macroeconomic research. The course falls into three parts: dynamic programming, new Keynesian economics, and recent theories of economic growth. The dynamic programming section includes models of consumption, investment, and real business cycles. The new Keynesian section covers models of wage and price rigidity, coordination failure, and credit markets. The section on endogenous growth looks at recent efforts to add nonconvexities to models of optimal growth. These topics are intended to complement the material on overlapping generations covered elsewhere.

ECON 713 Advanced Macroeconomics II
Spring. 4 credits. Prerequisites: ECON 613, 614.
This course reveiws the most recent research in endogenous growth theory. This theory is little more than a decade old, but it has produced a large number of both empirical and theoretical results that have substantially reshaped the general field of macroeconomics. It is perhaps no exaggeration to say that most of the work at the frontier of today's macroeconomics belongs to this field. An increasing number of papers have been touching important issues such as; learning by doing, R&D investment, market structure, private and public organization of R&D, education financing, human capital accumulation, technological unemployment, growth and business cycles, inequality and growth, political equilibrium, democracy and growth, instability, social conflict, capital accumulation, intergenerational and vested interests and barriers to technology adoption, international transfers of technologies, sustainable development, etc.

This course aims to orient the student in this large and variegated literature consisting of recently published articles and working papers. Understanding this literature is a sound training in the analytical methods used at the frontier of theoretical research, but it also provides a number of empirical results at the center of the economic debate.

ECON 717 Mathematical Economics
4 credits. Prerequisites: ECON 609–610 (or equivalent training in micro theory) and MATH 413–414 (or equivalent training in analysis).
The primary theme of this course is to explore the role of prices in achieving an efficient allocation of resources in dynamic economies. Some of the classical results on static equilibrium theory and welfare economics on attaining optimal allocation through decentralized organizations are examined through an axiomatic approach. Some basic issues on capital theory are also analyzed.

[ECON 718 Topics in Mathematical Economics
4 credits. Not offered 2001–2002.]

ECON 719 Advanced Topics in Econometrics I
Fall. 4 credits. Prerequisites: ECON 619–620 or permission of instructor.
Covers advanced topics in econometrics, such as asymptotic estimation and test theory, robust estimation, Bayesian inference, advanced topics in time-series analysis, errors in variable and latent variable models, qualitative and limited dependent variables, aggregation, panel data, and duration models.

ECON 720 Advanced Topics in Econometrics II
Spring. 4 credits. Prerequisites: ECON 619–620 or permission of instructor.
For description see ECON 719.

ECON 721 Time Series Econometrics
Spring. 4 credits. Prerequisites: ECON 619–620 or permission of instructor.
This course covers traditional and current time series techniques that are widely used in econometrics. Topics include: the theory of stationary stochastic processes including univariate ARMA(p,q) models, spectral density analysis, and vector autoregressive models; parametric and semi-parametric estimation; current developments in distributional theory; and estimation and testing in models with integrated regressors including, unit root tests, cointegration, and permanent vs. transitory components.

ECON 731 Monetary Economics
Spring. 4 credits. Prerequisites: ECON 614 or permission of the instructor.
Covers advanced topics in monetary economics, macroeconomics, and economic growth—such as overlapping-generations, taxes and transfers denominated in money, transactions demand for money, multi-asset accumulation, exchange rates, and financial intermediation.

ECON 732 Monetary Economics
Fall. 4 credits. Prerequisites: ECON 731 or permission of the instructor.
Covers advanced topics in monetary economics, macroeconomics, and economic growth—such as economic volatility, the "burden" of

government debt, restrictions on government borrowing, dynamic optimization, endogenous growth theory, technological evolution, financial market frictions, and cyclical fluctuations.

ECON 735 Public Finance: Resource Allocation and Fiscal Policy (also AEM 735)
Spring. 4 credits.
This course develops a mathematical and highly analytical understanding of the role of government in market economies and the fundamentals of public economics and related issues. Topics covered include: generalizations and extensions of the fundamental theorems of welfare economics, in-depth analysis of social choice theory and the theory on implementation in economic environments, public goods and externalities and other forms of market failure associated with asymmetric information. The theoretical foundation for optimal direct and indirect taxation is also introduced along with the development of various consumer surplus measures and an application to benefit cost analysis. Topics of an applied nature vary from semester to semester depending on faculty research interests.

ECON 736 Public Finance: Resource Allocation and Fiscal Policy
Fall. 4 credits.
This course spends a large part of the semester covering the revenue side of public finance. Topics include the impact of various types of taxes as well as the determination of optimal taxation. The impact of taxation on labor supply, savings, company finance and investment behavior, risk bearing, and portfolio choice are explored. Other topics include the interaction of taxation and inflation, tax evasion, tax incidence, social security, unemployment insurance, deficits, and interactions between different levels of government.

[ECON 737 Location Theory and Regional Analysis
Fall. 4 credits. Prerequisites: ECON 609, 617, and Econometrics. Not offered 2001–2002.
Covers economic principles influencing the location of economic activity, its spatial equilibrium structure, and dynamic forces. Topics include spatial pricing policies, price competition, and relocation by firms; residential location patterns; patterns of regional growth and decline; and patterns of urbanization.]

ECON 738 Public Choice
Spring. 4 credits. Prerequisites: ECON 609, 610.
This class has two parts. It begins with an introduction to economic theories of political decision making. We review the theory of voting, theories of political parties and party competition, theories of legislative decision making and interest group influence. We also discuss empirical evidence concerning the validity of these theories. The second part uses these theories to address a number of issues in Public Economics. We develop the theory of political failure, analyze the performance of alternative political systems and discuss the problem of doing policy analysis which takes into account political constraints.

ECON 741 Seminar in Labor Economics
For description see ILRLE 744.

ECON 742 Seminar in Labor Economics
For description see ILRLE 745.

ECON 751 Industrial Organization and Regulation
Fall. 4 credits. Prerequisites: ECON 609, 610.
This course focuses primarily on recent theoretical advances in the study of industrial organization. Topics covered include: market structure, nonlinear pricing, quality, durability, location selection, repeated games, collusion, entry deterrence, managerial incentives, switching costs, government intervention, and R&D/Patents. These topics are discussed in a game-theoretic context.

ECON 752 Industrial Organization and Regulation
Spring. 4 credits. Prerequisites: ECON 609, 610, 751.
This course rounds out some topics in the Theory of Industrial Organization with the specific intent of addressing the empirical implications of the theory. The course reviews empirical literature in the SCP paradigm and in the NEIO paradigm.

[ECON 753 Public Policy Issues for Industrial Organizations
Spring. 4 credits. Prerequisites: ECON 609, 610, and 751. Not offered 2001–2002.
The course takes an in-depth view of the interaction between the government and business. Methods of business control, including antitrust, price regulation, entry regulation, and safety regulation. Emphasis will be not only on the economic effects on business, but on the economics of selecting and evolving the method of control.]

[ECON 755 Rivalry and Cooperation
Fall. 4 credits. Prerequisites: Economics Graduate Core or instructor's permission. Not offered 2001–2002.
In standard models, economic interaction is impersonal. Agents respond to price signals and measure their own welfare not in relative but in absolute terms; and cooperative behavior emerges only when it coincides with narrow self-interest. This course explores the details of rivalry and cooperation in an effort to synthesize broader views of economic interaction. Topics include: the effect of concerns about relative income on wage rates, consumption, savings, and regulation; the effect of concerns about fairness on prices and wages; the conditions that foster trust and cooperation; and the role of positional competition in the distribution of economic rewards.]

ECON 756 Noncooperative Game Theory
Fall. 4 credits. Prerequisites: ECON 609–610 and 619.
This course surveys equilibrium concepts for noncooperative games. We cover Nash equilibrium and a variety of equilibrium refinements, including perfect equilibrium, proper equilibrium, sequential equilibrium and more! We pay attention to important special classes of games, including bargaining games, signalling games, and games of incomplete information. Most of our analysis is from the strict decision-theoretic point of view, but we also survey some models of bounded rationality in games, including games played by automata.

ECON 757 Economics of Imperfect Information
Spring. 4 credits. Prerequisites: ECON 609–610 and 619.
The purpose of this course is to consider some major topics in the economics of uncertain information. Although the precise topics considered vary from year to year, subjects such as markets with asymmetric information, signalling theory, sequential choice theory, and record theory are discussed.

ECON 758 Psychology and Economic Theory
Fall, spring. 4 credits. Prerequisites: grad core or instructors permission.
This course explores the ways in which insights from psychology can be integrated into economic theory. Evidence is presented on how human behavior systematically departs from the standard assumptions of Economics and how this can be incorporated into modeling techniques.

ECON 760 Topics in Political Economy
Fall. 4 credits. Prerequisite: Economics graduate core or instructor's permission.
This course develops critiques and extensions of economic theory, taking into account the political and social moorings of economic activity and equilibria. The formation and persistence of social norms; the meaning and emergence of property rights; the role of policy advice in influencing economic outcomes; and the effect of political power and ideology on economic variables are studied. While these topics were popular in the classic works of political economy, recent advances in game theory and, more generally, game-theoretic thinking allows us to approach these topics from a new perspective. Hence, the course begins by devoting some lectures to elementary ideas in game-theory and strategic analysis.

ECON 761 International Economics: Trade Theory and Policy
Fall. 4 credits. Prerequisites: ECON 609, 610.
This course surveys the sources of comparative advantage. It analyzes simple general equilibrium models to illustrate the direction, volume, and welfare effects of trade. Topics in game theory and econometrics as applied to international economics may be covered.

ECON 762 International Economics: International Finance and Open Economy Macroeconomics
Spring. 4 credits. Prerequisite: ECON 761.
This course surveys the determination of exchange rates and theories of balance of payment adjustments. It explores open economy macroeconomics by analyzing models of monetary economies. Topics in monetary economics and econometrics as applied to international economics are covered.

ECON 770 Topics in Economic Development
For description, see AEM 667.

ECON 771 Economic Development and Development Planning
Spring. 4 credits. Prerequisites: graduate core or instructor's permission.
Reviews the existing literature on the determinants of economic growth and the interrelationship of growth and income distribution through the process of economic development. A general equilibrium approach

to development is taken. Computable general equilibrium models, based on social accounting matrices, are used to explore the performance of a variety of developing countries. Among the topics explored are: impact of structural adjustment and stabilization policies on growth, equity and internal and external equilibrium; sectoral interrelationship and interdependence through the growth process. Critical review and evaluation of national, sectoral, and regional development models built for such developing countries as India, Brazil, Indonesia, and Ecuador.

ECON 772 Economics of Development
Spring. 4 credits. Prerequisites: first-year graduate economic theory and econometrics.
Analytical approaches to the economic problems of developing nations. Topics to be covered include: some old and new directions in development economics thinking, the welfare economics of poverty and inequality, empirical evidence on who benefits from economic development, labor market models, project analysis with application to the economics of education, and development policy.

ECON 773 Economic Development
Fall. 4 credits. Prerequisites: ECON 609 and 620.
The course is concerned with theoretical and applied works that seek to explain economic development, or lack thereof, in countries at low-income levels. Specific topics vary each semester.

ECON 774 Economic Systems
Spring. 4 credits.
The course deals with economic systems, formerly centrally planned economies, and economies in transition.

ECON 784 Seminars in Advanced Economics
Fall and spring. 4 credits.

ENGLISH

H. Shaw, chair; P. Sawyer, director of undergraduate studies (255–3492); R. Gilbert, director of graduate studies (255–7989); H. S. McMillin, director of honors program; J. Adams, J. Ashton, A. Boehm, F. Bogel, L. Bogel, M. P. Brady, L. Brown, C. Chase, B. Correll, J. Culler, S. Davis, E. DeLoughrey, L. Fakundiny, R. Farrell, D. Fried, A. Fulton, A. Galloway, J. Goldsby, K. Gottschalk, E. Hanson, L. Herrin, T. Hill, M. Hite, M. Jacobus, P. Janowitz, B. Jeyifo, C. Kaske, M. Koch, B. Maxwell, D. McCall, K. McClane, M. McCoy, M. K. McCullough, D. Mermin, S. Mohanty, R. Morgan, T. Murray, R. Parker, J. Porte, E. Rosenberg, N. Saccamano, S. Samuels, D. Schwarz, M. Seltzer, R. Shepherd, S. Siegel, H. Spillers, G. Teskey, S. Vaughn, H. Viramontes, N. Waligora-Davis, W. Wetherbee, S. Wong.
Emeriti: M. H. Abrams, B. Adams, J. Bishop, J. Blackall, A. Caputi, D. Eddy, R. Elias, A. Lurie, P. Marcus, J. McConkey, S. Parrish, M. Radzinowicz, S. C. Strout.

The Department of English offers a wide range of courses in English, American, and Anglophone literature as well as in creative writing, expository writing, and film analysis. Literature courses focus variously on close reading of texts, study of particular authors and genres, questions of critical theory and method, and the relationship of literary works to their historical contexts and to other disciplines. Writing courses typically employ the workshop method in which students develop their skills by responding to the criticism of their work by their classmates as well as their instructors. Many students supplement their formal course work in English by attending public lectures and poetry readings sponsored by the department or by writing for campus literary magazines. The department seeks not only to foster critical analysis and lucid writing but also to teach students to think about the nature of language and to be alert to both the rigors and the pleasures of reading texts of many sorts.

First-Year Writing Seminars

As part of the university-wide First-Year Writing Seminars program administered by the John S. Knight Institute for Writing in the Disciplines, the department offers many one-semester courses dealing with various forms of writing (e.g. narrative, autobiographical, and expository), with the study of specific areas in English and American literature, and with the relation of literature to culture. Students may apply any of these courses to their First-Year Writing Seminar requirement. Detailed course descriptions may be found in the First-Year Writing Seminars program listings, available from college registrars in August for the fall term and in November for the spring term.

Freshmen interested in majoring in English are encouraged to take at least one of the department's 200-level First-Year Writing Seminars: "The Reading of Fiction" (ENGL 270), "The Reading of Poetry" (ENGL 271), and "Introduction to Drama" (ENGL 272). These courses are open to all second-term freshmen. They are also open, as space permits, to first-term freshmen with scores of 700 or above on the CEEB College Placement Tests in English composition or literature, or 4 or 5 on the CEEB Advanced Placement Examination in English, as well as to students who have completed another First-Year Writing Seminar.

Courses for Nonmajors

For students majoring in fields other than English, the department provides a variety of courses at all levels. A number of courses at the 200 level are open to qualified freshmen, and all are open to sophomores. Courses at the 300 level are open to all sophomores, juniors, and seniors; they are also open to freshmen who have received the instructor's prior permission. The suitability of courses at the 400 level for nonmajors depends in part on the course topics, which are subject to change from year to year. Permission of the instructor is sometimes required; prior consultation is always in order and strongly advised.

The Major in English

Students who major in English develop their own programs of study in consultation with their major advisers. Some choose to focus on a particular historical period or literary genre or to combine sustained work in creative writing with the study of literature. Others pursue interests in such areas as women's literature, African-American literature, literature and the visual arts, or critical theory.

The department recommends that students prepare themselves for the English major by taking one or more of its preparatory courses, such as "The Reading of Fiction" (ENGL 270), "The Reading of Poetry" (ENGL 271), or "Introduction to Drama" (ENGL 272). (The "ENGL" prefix identifies courses sponsored by the Department of English, all of which appear in the English section of *Courses of Study* or the department's supplementary lists of courses; it also identifies courses sponsored and taught by other academic units and cross-listed with English.) These courses concentrate on the skills basic to the English major and to much other academic work—responsive, sensitive reading and lucid, strong writing. As First-Year Writing Seminars, any one of them will satisfy one-half the College of Arts and Science's First-Year writing requirement. ENGL 280, 281, 288, and 289 are also suitable preparations for the major and are open to students who have completed their First-Year Writing Seminar requirement. ENGL 201 and 202, which together constitute a two-semester survey of major British writers, though not required are strongly recommended for majors and prospective majors. ENGL 201 and 202 (unlike ENGL 280, 281, 288, and 289) are also "approved for the major" in the special sense of that phrase explained below.

To graduate with a major in English, a student must complete with passing letter grades 10 courses (40 credit hours) approved for the English major. All ENGL courses numbered 300 and above are approved for the major. In addition, with the exception of First-Year Writing Seminars (ENGL 270, 271, and 272), 200-level courses in creative and expository writing (ENGL 280, 281, 288, and 289), and courses designated for nonmajors, all 200-level ENGL courses are also approved for the major. Courses used to meet requirements for the English major may also be used to meet the "Humanities and the Arts" distribution requirement of the College of Arts and Sciences. Many of these courses may be used to meet the college's "historical breadth" requirement as well.

Of the 40 credits required to complete the major, 8 credits (two courses) must be at the 400 level or above; 12 credits (three courses) must be from courses in which 50 percent or more of the material consists of literature originally written in English before 1800; and another 12 credits (three courses) must form an intellectually coherent "concentration." The 400-level and pre-1800 requirements may be satisfied only with ENGL courses, and ENGL 493–494, the Honors Essay Tutorial, may not be used to satisfy either one. Courses that satisfy the pre-1800 requirement are so designated in *Courses of Study*. Many English majors use ENGL 201 to begin meeting this requirement since it provides an overview of earlier periods of British literature and so enables them to make more informed choices of additional pre-1800 courses. ENGL 202, however, does not qualify as a pre-1800 course. Neither do courses offered by other departments unless they are cross-listed with English. Although advanced courses in foreign literature read in the original languages may not be used to fulfill the pre-1800 requirement, they may be used for English major credit provided they are included within the 12-credit limit described below. The three-course concentration requirement may be satisfied with any courses approved for the major. The department's "Guide to the English Major" contains suggested areas of concentra-

tion and lists of courses that fall within the areas proposed, but majors are expected to define their own concentrations in consultation with their advisers.

As many as 12 credits in courses offered by departments and programs other than English may under certain conditions be used to satisfy English major requirements. Courses in literature and creative writing offered by academic units representing neighboring or allied disciplines (German Studies, Romance Studies, Russian, Asian Studies, Classics, Comparative Literature, Africana Studies, the Society for the Humanities, American Studies, Women's Studies, Religious Studies, Asian American Studies, Latino Studies, and Theatre, Film, & Dance) are routinely counted toward the 40 hours of major credit provided they are appropriate for juniors or seniors, as are most courses at the 300 level and above. English majors who are double majors may exercise this option even if all 12 credits are applied to their second major. All English majors are urged to take courses in which they read foreign works of literature in the original language, and for that reason 200-level literature courses for which qualification is a prerequisite (as well as more advanced foreign literature courses taught in the original language) may be counted toward the English major. Credit from other non-ENGL courses may be included within the 12 credits of nondepartmental courses approved for the major only when the student is able to demonstrate to the adviser's satisfaction their relevance to his or her individual program of study.

The Major in English with Honors

Second-term sophomores who have done superior work in English and related subjects are encouraged to seek admission to the department's program leading to the degree of Bachelor of Arts with Honors in English. Following an interview with the chair of the Honors Committee, qualified students will be admitted provisionally to the program. During their junior year these students must complete at least one Honors Seminar (ENGL 491 or 492); they are encouraged to take an additional 400-level English course in the field in which they plan to concentrate. On the basis of work in these and other English courses, a provisional Honors candidate is expected to select a thesis topic and secure a thesis adviser by the end of the junior year. A student who has been accepted by a thesis adviser becomes a candidate for Honors rather than a provisional candidate.

During the senior year, each candidate for Honors in English enrolls in a year-long tutorial (ENGL 493–494) with the faculty member who has agreed to serve as the student's thesis adviser. The year's work culminates in the submission of a substantial scholarly or critical essay to be judged by at least two members of the faculty. More information about the Honors Program may be found in a leaflet available in the English offices.

First-Year Writing Seminars Recommended for Prospective Majors

ENGL 270 The Reading of Fiction
Fall, spring, summer. 3 credits. Each section limited to 17 students. Recommended for prospective majors in English.
This course examines modern fiction, with an emphasis on the short story and novella. Students write critical essays on authors who flourished between 1870 and the present, such as James, Joyce, Woolf, Hurston, Lawrence, Fitzgerald, Hemingway, Faulkner, Rhys, Welty, Salinger, and Morrison. Reading lists vary from section to section, and some may include a novel, but close, attentive, imaginative reading and writing are central to all. *This course does not satisfy requirements for the English major.*

ENGL 271 The Reading of Poetry
Fall, spring. 3 credits. Each section limited to 17 students. Recommended for prospective majors in English.
How can we become more appreciative, alert readers of poetry, and at the same time better writers of prose? This course attends to the rich variety of poems written in English, drawing on the works of poets from William Shakespeare to Sylvia Plath, John Keats to Li-Young Lee, Emily Dickinson to A. R. Ammons. We may read songs, sonnets, odes, villanelles, even limericks. By engaging in thorough discussions and varied writing assignments, we explore some of the major periods, modes, and genres of English poetry, and in the process expand the possibilities of our own writing. *This course does not satisfy requirements for the English major.*

ENGL 272 Introduction to Drama
Fall, spring. 3 credits. Each section limited to 17 students. Recommended for prospective majors in English.
Students in this seminar study plays, older and newer, in a variety of dramatic idioms and cultural traditions. Plays being performed by the theatre department will be included, if possible. A typical reading list might include works by Sophocles, Shakespeare, Moliere, Chekhov, Brecht, Miller, Beckett, and Shange. Course work consists of writing and discussion and the occasional viewing of live or filmed performances. *This course does not satisfy requirements for the English major.*

Expository Writing

ENGL 288–289 Expository Writing (IV)
Fall, spring, summer, winter. 3 credits. Each section limited to 16 students. Students must have completed their colleges' first-year writing requirements or have the permission of the instructor. S. Davis and staff.
ENGL 288–289 offers guidance and an audience for students who wish to gain skill in expository writing. Each section provides a context for writing defined by a form of exposition, a disciplinary area, a practice, or a topic intimately related to the written medium. Course members read in relevant published material and write and revise their own work regularly, while reviewing and responding to each other's. Since these seminar-sized courses depend on members' full participation, regular attendance and submission of written work are required. Students and instructors will confer individually throughout the term. For more information please see the following web site: http//instruct1.cit.cornell.edu/Courses/engl288-89/. Topics for the various sections include:

Section 1—Roensch, R.—The Essay: Personal to Public

Section 2—Wesling, M.—Myths of the City

Section 3—Staff—Reading the News, Understanding the Media

Section 4—Boehm, A.—Minding the Body

Section 5—LeGendre, B.—Issues, Audiences, and Ourselves

Spring 2002 topics TBA.

See English department *Course Offerings* for full fall and spring section descriptions.

This course does not satisfy requirements for the English major.

ENGL 381 Reading as Writing (IV)
Fall. 4 credits. Course limited to 15 students. Prerequisite: permission of the instructor on the basis of a writing sample (critical/interpretive prose), which should reach the instructor before the first day of class. S. Davis.
"Haven't you ever happened to read while looking up from your book?" asked one theorist of reading, "not because you weren't interested, but because you were: because of a flow of ideas, stimuli, associations?" Students in this course look into the intricacies of the reading-writing process, reading a small number of nineteenth- and twentieth-century novels and poems, writing frequently about them, and reading each other's writing as collaborators and commentators. They "look up" frequently to pay conscious attention to the way writers' original literary works are often "readings" of the work of other writers and to the way our own readings may, critically and creatively, rewrite the literary texts we read. This is a course for English majors and non-majors who wish to extend their mastery of critical and interpretive prose and their understanding of what they do when they write it. It is advantageous for those planning to write honors theses in English or another discipline to take this course. The 2001 reading list (tentatively): Nabokov's *Pale Fire*, Wordsworth's two-part *Prelude*, Brontë's *Jane Eyre*, James' *Turn of the Screw*, Rhys' *Wide Sargasso* Sea, and Wilde's *Dorian Gray*.

ENGL 386 Philosophic Fictions (IV)
Spring. 4 credits. S. Davis.
Course limited to 15 students. Prerequisite: permission of the instructor on the basis of a writing sample (critical/interpretive prose), which should reach the instructor before the first day of class.

"Fictions"—of voice, audience, plot, point of view, figurative language, and thought—abound in good expository writing; they stand out in works that deliberately test and play with ideas: dialogues, satires, parodies, parables, philosophic tales, and "thought-experiments." Students write critically about such works and the issues they raise and experiment with writing in similar forms. The "fictions" read and written in this course are not realistic narratives or evocations of personal experience; they are the vehicles and animating resources of writers who want to argue flexibly, provoke thought, ridicule vice or folly, play games, or involve readers in pleasingly or disturbingly insoluble problems. Readings include such works as Plato's *Republic*, Swift's "Modest Proposal" and *Tale of a Tub*, Voltaire's *Candide*, Carroll's *Alice* books, short fictions by Jorge Luis Borges and Octavia Butler, and essays by Richard Rorty and Anthony Appiah.

[ENGL 387 Autobiography: Theory and Practice (IV)
4 credits. Next offered 2002–2003. A. Boehm.]

ENGL 388 The Art of the Essay (IV)
Fall. 4 credits. Limited to 15 students. Interested students should submit 1 or more pieces of recent writing (prose) to the instructor before the beginning of the term, preferably at preregistration. L. Fakundiny.
For both English majors and nonmajors who have done distinguished work in first-year writing seminars and in such courses as ENGL 280–281, 288–289, and who desire intensive practice in writing essays as a kind of creative nonfiction. The course assumes a high degree of self-motivation, a capacity for independent work, and critical interest in the work of other writers; it aims for a portfolio of conceptually rich and stylistically polished writing.

Creative Writing

Students usually begin their work in Creative Writing with ENGL 280 or 281, and only after completion of the First-Year Writing Seminar requirement. Please note that either ENGL 280 or ENGL 281 is the recommended prerequisite for 300-level creative writing courses. ENGL 280 and 281 may satisfy a distribution requirement in your college (please check with your college adviser). ENGL 382–383, 384–385, and 480–481 are approved for the English major.

ENGL 280–281 Creative Writing (IV)
Fall, spring, summer, winter. 3 credits. Prerequisites: completion of the Freshman Seminar requirement. Limited to 18 students.
Majors and prospective majors, please note. Although recommended for prospective English majors, ENGL 280–281 cannot be counted towards the 40 credits required for completion of the English major. It is a prerequisite for 300-level courses in creative writing, which count towards the major. ENGL 280 is not a prerequisite for ENGL 281.

An introductory course in the theory, practice, and reading of prose, poetry, and allied forms. Students are given the opportunity to try both prose and verse writing and may specialize in one or the other. Many of the class meetings are conducted as workshops.

ENGL 382–383 Narrative Writing (IV)
Fall, 382; spring, 383. 4 credits each term. Each section limited to 15 students. Previous enrollment in ENGL 280 or 281 recommended. Prerequisite: permission of instructor, normally on the basis of a manuscript. Fall: Sec. 1, D. McCall; sec. 2, S. Vaughn; sec. 3, R. Morgan. Spring: H. Viramontes, M. Koch, S. Vaughn.
The writing of fiction; study of models; analysis of students' work.

ENGL 384–385 Verse Writing (IV)
Fall or summer, 384; spring, 385. 4 credits each term. Each section limited to 15 students. Prerequisites: ENGL 280 or 281, or permission of instructor. Fall: P. Janowitz, K. McClane. Spring: P. Janowitz, A. Fulton.
The writing of poetry; study of models; analysis of students' poems; personal conferences.

ENGL 480–481 Seminar in Writing (IV)
Fall, 480; spring 481. 4 credits each term. Each section limited to 15 students. Prerequisite: permission of instructor, normally on the basis of a manuscript. The manuscript should be submitted to the instructor no later than the first day of class. Previous enrollment in ENGL 280 or 281 and at least one 300-level writing course recommended. Successful completion of one half of the 480-481 sequence does not guarantee enrollment in the other half; students must receive permission of the instructor to enroll in the second course. Fall: Sec. 1, H. Viramontes, sec. 2, R. Morgan. Spring: P. Janowitz, S. Vaughn.
Intended for those writers who have already gained a basic mastery of technique. Although ENGL 480 is not a prerequisite for ENGL 481, students normally enroll for both terms and should be capable of a major project—a collection of stories or poems, a group of personal essays, or perhaps a novel—to be completed by the end of the second semester. Seminars are used for discussion of the students' manuscripts and published works that individual members have found of exceptional value.

Courses for Freshmen and Sophomores

These courses have no prerequisites and are open to freshmen and nonmajors as well as majors and prospective majors.

Introductions to Literary Studies

ENGL 201–202 The English Literary Tradition # (IV)
201: fall. 4 credits. ENGL 201 is not a prerequisite for 202. This course may be used as one of the three courses before 1800 required of English majors. A. Galloway.
An introduction to the study of English literature, examining its historical development and some of its achievements within the contexts of cultural, intellectual, and religious history from its beginnings in the 8th century through the 17th century. Some of the works we read, discuss and write about across this thousand-year span are *Beowulf*; *Sir Gawain and the Green Knight*; selections from Chaucer's *Canterbury Tales* and Spenser's *Faerie Queene*; Shakespeare's *Sonnets* and *King Lear*; poems by Sidney, Jonson, Donne, Herbert, Herrick, and Marvell; and selections from Milton's *Paradise Lost*.

202: spring. 4 credits. D. Fried.
A survey of English literature from the late seventeenth century to the start of the twentieth century. The focus is on English poetry, drawn from a range of genres and modes, and including Pope's *Rape of the Lock* and the poems and illustrations of Blake's *Songs of Innocence and of Experience*. In addition we read two novels (Swift's *Gulliver's Travels*, Austen's *Persuasion*), and one play (Wilde's *The Importance of Being Earnest*). Lectures twice a week, and once a week small discussion groups provide a chance for closer scrutiny of texts and topics covered in the lectures.

ENGL 207 Introduction to Modern Poetry (IV)
Fall. 4 credits. R. Shepherd.
This course samples the vast array of poetic modes and forms employed over the past century and a half, with primary emphasis on the work of American poets. Our focus in the course is on the poems themselves—what they mean, how they feel, sound, look, and behave. Lectures, discussions, and written assignments emphasize both the craft of writing poetry and the discipline of reading it with understanding and appreciation. No previous study of poetry required.

ENGL 208 Shakespeare and the Twentieth Century (IV)
Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. S. Davis.
What can we learn about Shakespeare's plays from their reception in the twentieth century? What can we learn about twentieth century cultures from their appropriations of these texts and their reinventions of the Shakespeare legend? We compare four or five plays with their adaptations in fiction, theater, and film and explore the uses made of Shakespeare in education, advertising, and public culture. Our discussions try to illuminate the vast differences and startling continuities among the Shakespeares handed down by earlier times and those recovered or invented in the modern era; we also pay attention to the variety of critical approaches readers and viewers have taken to Shakespeare on the page and in performance. For spring 2002, tentatively: *Romeo and Juliet*, *Titus Andronicus*, *Othello*, *Macbeth*, and *The Tempest*, together with plays by Eugene Ionesco and Aimé Césaire and films or stage productions directed by Baz Lurhmann, Julie Taymor, Akira Kurosawa, Trevor Nunn, Janet Suzman, and Fred Wilcox.

ENGL 227 Shakespeare # (IV)
Spring, summer, and winter. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. W. Wetherbee.
Careful study of 10 of Shakespeare's major plays, including at least three videotaped performances.

Major Genres and Areas

ENGL 203 Major Poets (IV)
Fall. 4 credits. R. Gilbert.
Intensive readings in the work of nine poets chosen to represent important periods, modes, and assumptions about the uses of poetry. Poets studied may include William Shakespeare (the sonnets), Andrew Marvell, Alexander Pope, John Keats, Emily Dickinson, Robert Browning, Robert Frost, Gwendolyn Brooks, and Seamus Heaney.

[ENGL 209 Introduction to Cultural Studies (IV)
4 credits. Next offered 2002–2003.]

[ENGL 240 Survey in U.S. Latino Literature (also LSP 240) (IV)
4 credits. Next offered 2002–2003.]

ENGL 251 Twentieth-Century Women Novelists (also WOMNS 251 and AM ST 252) (IV)
Fall. 4 credits. S. Samuels.
This course is particularly concerned with questions about women's experience and perspective and explores intersections of gender, ethnicity, race, sexuality, and other vectors of identity. We read novels by Nella Larson, Dorothy Allison, Louise Erdrich, Toni Morrison, Helena María Viramontes, Fae Ng, Cristina Garcia, and others. Assignments include two papers, a research project, and a number of short in-class writings.

ENGL 255 African Literature @ (IV)
Spring. 4 credts. B. Jeyifo.
An introduction to major African writers and literary traditions. Authors to be studied may include Wole Soyinka, Chinua Achebe, Bessie Head, Ayi Kwei Armah, Ama Ata Aidoo, Tayeb Salih, and Ousmane Sembene.

[ENGL 260 Introduction to American Indian Literatures (also AM ST 260) (IV)
4 credits. Next offered 2002–2003.]

ENGL 262 Introduction to Asian American Literature (also AM ST 262 and AAS 262) (IV)
Spring. 4 credits. S. Wong.
This course introduces students to a range of writing by Asian Americans and to some critical issues concerning the production and the reception of Asian American texts. In reading through selected works of prose, poetry and drama, we ask questions about the relation between literary forms and the sociohistorical context within which they take on their meanings, and about the historical formation of Asian American identities.

ENGL 274 Scottish Literature and Culture # (IV)
Fall. 3 or 4 credits. The course may be taken for 3 or 4 credits; those taking it for 4 credits will complete an additional writing project. If taken for four credits, it counts toward the English major, but non-majors are welcome. This course may be used as one of the three pre-1800 courses required of English majors. T. Hill and H. Shaw.
Scotland was an independent kingdom during most of its history. Although it is now politically united with England, it preserves a cultural distinctiveness. This course provides an introduction to Scottish literature and its cultural context. We focus on important Scottish literary texts, with special emphasis on the medieval period and the eighteenth through the twentieth centuries. The course should appeal to those who wish to learn more about their Scottish heritage, to those who wish to view in a new perspective works normally considered monuments of "English" literature, and to those who simply wish to know more about a remarkable culture and the literature Scotland has produced. Some of the texts are read in Scots, but no familiarity with Scots or earlier English is presumed. Authors studied include Henryson, Dunbar, Anonymous (the Scottish Ballads), Hume, Burns, Scott, Hogg, Stevenson, and Grassic Gibbon.

ENGL 275 The American Literary Tradition (also AM ST 275) (IV)
Spring. 4 credits. N. Waligora-Davis.
The problem of an American national literature is explored through the reading, discussion, and close analysis of texts across the range of American literary history. Not a survey, this course focuses on the relations of the texts to each other, the shaping of national identities in those relationships, and the assumptions about history, language, and the self that underlie them.

[ENGL 278 Queer Fiction (also WOMNS 278) (IV)
4 credits. Next offered 2002–2003.]

[ENGL 295 The Essay in English # (IV)
4 credits. Prerequisite: completion of the First-Year Writing Seminar requirement. This course may be used as one of the three pre-1800 courses required of English majors. Next offered 2002–2003.
L. Fakundiny.]

Special Topics

ENGL 217 History of the English Language (also LING 217) (III or IV)
Fall. 4 credits. W. Harbert.
See LING 217 for full course description.

ENGL 220 The Idea of the Pet in Literature and History (IV)
Spring. 4 credits. Enrollment is limited to 15 students. While not restricted to sophomores this course is intended to offer sophomores especially an opportunity to work closely with faculty in a seminar environment within a strong interdisciplinary context. L. Brown.
Animal companions are signs of our modernity. They can confirm our humanity, or call it into question. This course studies the culture of pet keeping from the perspectives of literature, history, and philosophy. It introduces students to the methods of cultural critique currently prominent in literary studies, and to some of the recent approaches to the topic of the human relation to the natural world. We begin with the historical origins of pet keeping in the eighteenth century, and then turn to focus on the literature of pets in the nineteenth and twentieth centuries. We move from literary critical questions about the representation of animals to discussions of the social and moral dimensions of pet keeping and the ethics of animal rights. The course includes a workshop on the modern veterinarian's relationship with the companion animal and its owner, and a forum on the ethics of the treatment of animals. Reading include works by William Wordsworth, Virginia Woolf, Jack London, Albert Payson Terhune, and J. M. Coetzee. Three short papers and a final interdisciplinary term paper are required.

ENGL 221 The Ethics of Imagining the Holocaust (IV)
Fall. 4 credits. Enrollment is limited to 15 students. While not restricted to sophomores this course is intended to offer sophomores especially an opportunity to work closely with faculty in a seminar environment within a strong interdisciplinary context. D. Schwarz.
Beginning with memoirs and diaries, and moving to realistic texts and finally fables, myths, and cartoons, this interdisciplinary seminar about ethical issues in writing and reading about the Holocaust selects its syllabus from among the following texts: Wiesel's *Night*, Levi's *Survival at Auschwitz* and *The Periodic Table*, *Anne Frank: The Diary of a Young Girl*, Lanzmann's film *Shoah*, Borowski's *This Way for the Gas Chamber, Ladies and Gentlemen*, Ozick's *The Shawl* (the volume including both "The Shawl" and the sequel, "Rosa"), Hersey's *The Wall*, Epstein's *King of the Jews*, Kosinsky's *The Painted Bird*, both Kineally's novel *Schindler's List* and the Spielberg film of that novel, Styron's *Sophie's Choice*, the recent film *Life is Beautiful*, Appelfeld's *Badenheim* 1939, Schwarz-Bart's *The Last of the Just*, and Spiegelman's *Maus*. We also read a few of the important histories of the period, including those by Lucy Davidowicz (*The War Against the Jews, 1933–1945*) and Martin Gilbert (*The Holocaust: The Jewish Tragedy*). Working with a number of major memoirs, novels, and films about the Holocaust, the course discusses the following issues: How does one survive when the traditional assumptions on which civilized life are based break down? How does one discuss how memory transforms reality and how words transform memory? Can we speak ethically, when addressing the Holocaust? How can those of us who are not survivors write ethically about the Holocaust since, through our writing, we cannot make amends for not being victims? Why do some of those closest to events object to films like *Schindler's List*? What is the ethics of ethnocentrism? Can we define an ethics of Holocaust writing? How would such an ethics affect the anesthetics of representing the Holocaust—or, indeed, other historical atrocities?

ENGL 225 Poetry and Poetics of Difference (also COM L 225) (IV)
Spring. 4 credits. J. Monroe.
See COM L 225 for full course description.

[ENGL 235 Rewriting the Classics: Stories of Travels and Encounters (IV)
4 credits. Next offered 2002–2003.
E. DeLoughrey.]

ENGL 263 Interpreting Hitchcock (also THETR 263) (IV)
Spring. 4 credits. Lab fee. Enrollment limited to 20. L. Bogel.
Through detailed analysis of about 15 of Hitchcock's major films—from early British talkies (*Blackmail, The Thirty-Nine Steps*), to early 40s work in Hollywood (*Shadow of a Doubt, Notorious*), and major American films of his late period (*Rear Window, Vertigo, North by Northwest, Psycho, The Birds*)—we consider Hithcock as a major technical and stylistic innovator in the history of cinema. As texts for psychoanalytic and feminist approaches to study, his films invite questions about film language, the ethics of spectatorship, and the nature of desire and sexuality. For this writing-intensive seminar—including two essays, numerous reading responses, and viewing exercises in close analysis—students must be free to attend Monday late afternoon screenings of the films.

ENGL 266 Asian American Women and Literature (also AAS 266 and AM ST 266) (IV)
Fall. 4 credits. S. Davé.
This course explores the intersection of ethnicity, race, class, gender, and sexuality in the lives and literature of Asian American women. We discuss and analyze the historical, and contemporary social, political, and economic forces that have shaped women's lives and how they are reflected in literature. Our goal in the course is to explore and discover the diversity of voices in Asian American women's experiences and the similarities and commonalities of their social histories.

ENGL 268 Politics and Culture in the 1960s (also AM ST 268) (IV)
Spring. 4 credits. P. Sawyer.
Were the sixties a time of dangerous experimentation with drugs, sex, and alternative lifestyles on the part of a pampered generation that gradually learned to straighten up and join the mainstream? Or was it a time

of revolutionary hopefulness, when the civil rights movement and the Vietnam War stimulated an impassioned critique that changed American society? What can the experiences of young "boomers" contribute to a later generation, the first of the twenty-first century? The course explores these and other questions by focusing on the topics of racial justice, the Vietnam War, the counterculture, the New Left, the woman's movement and the movement for gay rights. Texts include *The Autobiography of Malcolm X, The Electric Kool-Aid Acid Test, Dispatches,* the poems of Allen Ginsburg and Adrienne Rich, films, music, speeches, and manifestos.

ENGL 273 Children's Literature (IV)
Fall. 4 credits. J. Adams.
An historical study of children's literature from the seventeenth century to the present, principally in Europe and America, which explores changing literary forms in relation to the social history of childhood. Ranging from oral folktale to contemporary novelistic realism (with some glances at film narrative), major figures include Perrault, Newbery, the Grimms, Andersen, Carroll, Alcott, Stevenson, Burnett, Kipling, the Disney studio, E. B. White, C. S. Lewis, Sendak, Silverstein, Mildred Taylor, and Bette Greene. We also encounter a variety of critical models—psychoanalytic, materialist, feminist, structuralist—that scholars have employed to explain the variety and importance of children's literature.

[ENGL 291 The American 1920s: Literature and Culture (also AM ST 291) (IV)
4 credits. Next offered 2002–2003. B. Maxwell.]

ENGL 292 Introduction to Visual Studies (IV)
Spring. 4 credits. T. Murray.
See A&S 200 for full course description.

Courses for Sophomores, Juniors, and Seniors

Courses at the 300 level are open to sophomores, juniors, and seniors and to others with the permission of the instructor.

ENGL 302 Literature and Theory (also ENGL 602 and COM L 302 and 622) (IV)
Fall. 4 credits. J. Culler.
Study of issues in contemporary theoretical debates, with particular attention to structuralism, deconstruction, psychoanalysis, and feminism. Readings by Roland Barthes, Judith Butler, Jacques Derrida, Michel Foucault, Barbara Johnson, Jacques Lacan, and others. No previous knowledge of literary theory is assumed.

ENGL 308 Icelandic Family Saga # (IV)
Fall. 4 credits. This course may **not** be used as one of the three pre-1800 courses required of all English majors. T. Hill.
An introduction to Old Norse-Icelandic mythology and the Icelandic family saga—the "native" heroic literary genre of Icelandic tradition. Texts vary but normally include the *Prose Edda*, the *Poetic Edda, Hrafnkels Saga, Njals Saga, Laxdaela Saga*, and *Grettirs Saga*. All readings are in translation.

[ENGL 310 Old English in Translation # (IV)
4 credits. Next offered 2001–2002.]

ENGL 311 Old English (also ENGL 611) # (IV)
Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. R. Farrell.
This course provides a grounding in the Old English language, and precedes the reading of some major texts in poetry, such as *The Wanderer* and The *Battle of Maldon*. No previous knowledge of Old or Middle English is required or expected. There is both a mid-term and a final, plus oral reports. Students are encouraged to follow their own interests. Graduate students are expected to do a substantial paper, or other research exercise.

ENGL 312 *Beowulf* (also ENGL 612) # (IV)
Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. T. Hill.
A close reading of *Beowulf*. Attention is given to relevant literary, cultural, and linguistic issues. One semester's study of Old English, or the equivalent, is recommended.

ENGL 313 The Structure of English (also LING 311) (III or IV)
Fall. 4 credits. M. Suner.
See LING 313 for full course description.

ENGL 314 Life, Literature, and Power in Late-Medieval England (also HIST 310) # (III or IV)
Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of all English majors. A. Galloway and P. Hyams.
See HIST 310 for full course description.

ENGL 319 Chaucer # (IV)
Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. R. Farrell.
This course will begin with the study of the major *Canterbury Tales* and some of his minor works, such as *The Book of the Duchess*. If time permits, we will read at least part of his great epic romance *Troilus and Criseyde*. All works will be read in Middle English, but ample time will be devoted to learning the language, for it is impossible to read Chaucer as a poet without Middle English. There will be lectures on Chaucer's life, society, literary, and religious content. There will be take-home, mid-, and end-of-term exams and student presentations.

ENGL 321 Spenser and Malory (also RELST 319) # (IV)
Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. Informal lecture and discussion. Two papers, no exams. C. Kaske.
Paired selections covering about half of Malory's *Morte d'Arthur* and half of Spenser's *Faerie Queene*. The French Prose Arthurian Cycle, Chretien's romances, *Sir Gawain and the Green Knight,* and some of Spenser's minor poems are mentioned occasionally as background. Comparisons assess possible literary influence, the distinctive vision, style and narrative technique of each author as a writer of romance, and the development of Arthurian romance from the Middle Ages to the Renaissance.

[ENGL 327 Shakespeare: Gender and Power (also WOMNS 327) # (IV)
4 credits. This course may be used as one of the three pre-1800 courses required of English majors. Next offered 2002–2003.]

ENGL 328 The Bible # (IV)
Fall. 4 credits. G. Teskey.
An introduction to the Bible as what William Blake called "the great code of art." The purpose of the course is to provide students of English literature with a basic knowledge of that literature's most important, underlying text. We examine such matters as the significance of the polemical division of the Bible into "old" and "new" testaments; the division of the Hebrew scriptures into narrative, legal, historical, and prophetic books; the structure of the new testament writings about Jesus, the Christian church, and history; the historical contexts for various parts of the Bible, in particular the fate of the Hebrew nation from about 1200 B.C. and of the early Christian church under the Roman empire; the resource of poetic imagery that Biblical writings have provided for three thousand years; and the unusual, imaginative power of prophecy. The King James Version (1611) is used.

ENGL 329 Milton # (IV)
Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. G. Teskey.
An introduction to the life, poetry, and ideas of John Milton, the most important English poet after Shakespeare.

ENGL 330 Restoration and Eighteenth-Century Literature # (IV)
Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. F. Bogel.
Close reading of texts in a variety of genres (poetry, fiction, drama, autobiography) are guided by such topics as: the nature of satire, irony, and mock-forms; the languages of the ridiculous and the sublime; the politics of gender and sexuality; the authority and fallibility of human knowledge; connections among melancholy, madness, and imagination. Works by such writers as Rochester, Behn, Finch, Dryden, Swift, Gay, Defoe, Johnson, Boswell, Sterne, and Cowper.

ENGL 333 The Eighteenth-Century English Novel # (IV)
Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. N. Saccamano.
A study of form and theme in the British novel tradition. The course focuses on representative novels mostly from the eighteenth century, paying close attention to language and structure but also to cultural contexts and to the development of the novel form itself. We explore such topics as truth and fiction; romance, realism, satire, and the gothic; heroic and mock-heroic modes; sentiment, sensibility, and sexuality; race and gender; and the forms and uses of narrative. Readings may include Behn's *Oroonoko*, Defoe's *Moll Flanders*, Richardson's *Clarissa*, Fielding's *Tom Jones*, Johnson's *Rasselas*, Sterne's *A Sentimental Journey*, and Austen's *Emma*.

ENGL 340 The English Romantic Period # (IV)
Fall. 4 credits. This course may **not** be used as one of the three pre-1800 courses required of all English majors. R. Parker.
Readings in various writers from the early 1790s to the early 1820s—among them Blake, Wordsworth, Wollstonecraft, Coleridge, Byron, Hazlett, Mary Shelley, Percy Shelley, and Keats—with major emphasis on poetry but with substantial attention to prose fiction, drama, letters, and political and literary essays.

The course is concerned with close reading of formal experiments in narrative, lyric and dramatic representation and with analysis of their relation to political and cultural issues and contexts in an age of national reform and international revolution and conflict.

[ENGL 345 Victorian Controversies # (IV)
4 credits. Next offered 2002–2003.
S. Siegel.]

[ENGL 348 Studies in Women's Fiction (also WOMNS 348) (IV)
4 credits. Next offered 2002–2003.]

ENGL 350 The Modern Tradition I: 1890–1930 (IV)
Fall. 4 credits. D. Schwarz.
Critical study of major works by Hardy, Conrad, Lawrence, Joyce, Woolf, Eliot, Yeats, Hopkins, Wilde, Wallace Stevens, and others. While the emphasis is on close reading of individual works we place the authors and works within the context of literary and intellectual history. The course seeks to define the development of literary modernism (mostly but not exclusively in England), and relate literary modernism in England to that in Europe and America as well as to other intellectual developments. We are especially interested in the relationship between modern literature and modern painting and sculpture, occasionally looking at slides.

ENGL 353 The Modern Indian Novel @ (IV)
Spring. 4 credits. S. Mohanty.
A survey of the modern Indian novel, from its origins in the latter part of the 19th century to the present. An attempt is made to read the novels as responses to colonialism and to the challenges of a postcolonial society. Texts (mainly novels, but also a few short stories) drawn from a variety of Indian languages as well as English, including works by such authors as U. R. Ananthamurthy, Rabindranath Tagore, Salman Rushdie, Gopinath Mohanty, Anita Desai, Fakir Mohan Senapati, Ambai, Prem Chand, Arundhati Roy, and R. K. Narayan. Two papers (5–6 pp. and 12–14 pp.) and a journal.

[ENGL 355 Decadence (also COM L 355 and WOMNS 355) (IV)
4 credits. Next offered 2002–2003.]

[ENGL 356 Postmodernist Fiction (IV)
4 credits. Next offered 2002–2003.]

ENGL 361 Early American Literature (also AM ST 361) # (IV)
Fall. 4 credits. This course may be used as one of the three pre-1800 courses required for the English major. J. Porte.
American literature and culture from the 1630s to the 1830s, including some of the following: prose and poetry of the Puritans (Winthrop, Bradford, Bradstreet, Rowlandson, Taylor, Cotton Mather) study of the witchcraft phenomenon; Edwards and Franklin; Tom Paine; Jefferson; Crèvecoeur; Rebecca Rush's *Kelroy*; selections from Irving's *Sketchbook*; the writing of William Apess; the poetry of Bryant; a novel by James Fenimore Cooper; the early work of Emerson and Hawthorne.

[ENGL 362 The American Renaissance (also AM ST 362) (IV)
4 credits. Next offered 2002–2003.]

[ENGL 363 The Age of Realism and Naturalism (also AM ST 363) (IV)
Fall. 4 credits. Next offered 2002–2003.]

[ENGL 364 American Literature Between the Wars (also AM ST 364) (IV)
4 credits. Next offered 2002–2003.]

ENGL 366 The Nineteenth-Century American Novel (also AM ST 366) # (IV)
Fall. 4 credits. D. McCall.
A study of American fiction in its first flowering. This course includes such major works as Hawthorne's *The Scarlet Letter*, Melville's *Moby-Dick*, James's *The Portrait of a Lady*, and Mark Twain's *Adventures of Huckleberry Finn*.

ENGL 367 The Modern American Novel (also AM ST 367) (IV)
Spring. 4 credits. D. McCall.
A reading of some modern American writers of the first half of the twentieth century. Works by Hemingway, Fitzgerald, Faulkner. Lectures with some opportunity for discussion. Emphasis is on the individual works in their historical contexts.

ENGL 368 American Novel Since 1950 (also AM ST 368) (IV)
Fall. 4 credits. P. Sawyer.
A survey of some distinguished American novels of the recent past, with particular attention to narrative structure, and political implication. We explore the relationships between gender, ethnicity, and "Americanness"; between documentary realism and "magical" or satiric abstraction; and between traumatic memory and the impulse to narrate. Readings may include Bellow's *The Victim*, Nabokov's *Lolita*, Heller's *Catch-22*, Pynchon's *The Crying of Lot 49*, Doctorow's *The Book of Daniel*, Kingston's *The Woman Warrior*, and Morrison's *Beloved*.

ENGL 369 Fast Talking Dames and Sad Ladies (also WOMNS 369 and THETR 367) (IV)
Fall. 4 credits. Enrollment limited to 15. Regular critical readings, frequent viewing questions, two longer essays, no exam. Students must be free to attend Monday and/or Tuesday late-afternoon screenings. $20 lab fee. L. Bogel.
In this seminar focusing on brash heroines of Hollywood's 1940s films and 1990s films, we work to define romantic comedy and melodrama as genres; as vehicles for female stars, sassy or subdued; as ways of viewing the world. Psychoanalytic and feminist analyses of these films help us pose questions about gender and culture, about gendered spectatorship, about the relation of these films to American culture, about Hollywood's changing constructions of "woman," the "maternal," and the "feminine," and about representations of desire, pleasure, fantasy, and ideology. Required weekly screenings of such films as *Gilda, The Lady Eve, Gentlemen Prefer Blondes, Notorious, The Women, The Philadelphia Story, His Girl Friday, The Piano, Mrs. Dalloway, First Wives' Club, Silence of the Lambs, Girl Fight, Erin Brokovich*.

ENGL 370 The Nineteenth Century Novel # (IV)
Spring. 4 credits. J. Adams.
A survey of representative works by major British novelists from Austen to Hardy. As great writers in a realistic mode, these novelists explore the interplay of self and society, particularly the clash between traditional social orders—class, gender, marriage—and new forms of mobility and self-determination in the world's first industrial nation. We are especially interested in the novel's preoccupation with domestic life, and reshapings of the familiar "marriage plot" in a world of great social and sexual anxiety. In short: love and money. Readings include works by Austen, Thackery, Dickens, C. Brontë, Braddon, George Eliot, and Hardy.

[ENGL 372 English Drama to 1700 (also THETR 372) # (IV)
Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. Next offered 2002–2003.
S. McMillin.]

[ENGL 373 English Drama from 1700 to the Present (also THETR 373) # (IV)
4 credits. Next offered 2002–2003.
S. McMillin.]

ENGL 376 Survey in African American Literature: 1918 to present (IV)
Spring. 4 credits. H. Spillers.
This course selects its readings from the genres of poetry, drama, fiction, and nonfiction produced by black American writers from the period of the Harlem Renaissance, to the present. Readings include poems by Harlem Renaissance poets, the poets of African-American modernism, i.e., Gwendolyn Brooks and Robert Hayden, and some of the poetry of the Black Arts Movement of the 60s, by way of Leroi Jones/Imamu Baraka's and Larry Neal's *Black Fire*; plays by Lorraine Hansberry, Ed Bullins, and August Wilson; nonfictional and fictional writings by Malcolm X, Martin Luther King, Nella Larsen, Jean Toomer, Zora Neale Hurston, Toni Morrison, and Nate Mackey. *Cane, The Autobiography of an Ex-Colored Man, Passing, The Autobiography of Malcolm X, Letter from an Birmingham Jail, Black Boy, Invisible Man, Flight to Canada, Oxherding Tales, Middle Passage, Jazz*, and *The Bedouin Hornbook* will be among the selected texts. The course is designed for majors, but is open to all interested students.

[ENGL 378 American Poetry Since 1950 (also AM ST 372) (IV)
4 credits. Next offered 2002–2003.]

ENGL 381 Reading as Writing (IV)
See complete course description in section headed Expository Writing.

ENGL 382–383 Narrative Writing (IV)
See complete course description in section headed Creative Writing.

ENGL 384–385 Verse Writing (IV)
See complete course description in section headed Creative Writing.

ENGL 386 Philosophic Fictions (IV)
See complete course description in section headed Expository Writing.

ENGL 388 The Art of the Essay (IV)
See complete course description in section headed Expository Writing.

[ENGL 390 Autobiography: Memoir, Memory, and History (IV)
4 credits. Next offered 2002–2003.]

[ENGL 395 Video: Art, Theory, and Politics (also THETR 395) (IV)
4 credits. Next offered 2002–2003.
T. Murray.]

[ENGL 396 Introduction to Global Women's Literature (also WOMNS 396) @ (IV)
4 credits. Next offered 2002–2003.
E. DeLoughrey.]

ENGL 397 Policing and Prisons in American Culture (also AM ST 395) (IV)

Spring. 4 credits. B. Maxwell.

Having attained the highest number of incarcerated persons of any nation on earth, while subjecting the citizenry to ordeals that most recently bear the names King, Louima, and Diallo, United States regimes of policing and imprisonment compel historical and critical attention. This course considers policing and imprisonment in United States culture, stressing prisoners' writing, song, slang, and graphic art. Edgar Allan Poe wrote in 1849: "in looking back through history...we should pass over all biographies of 'the good and great,' while we search carefully the slight records of wretches who died in prison, in Bedlam, or upon the gallows." These records—novels, stories, poems, plays, raps, songs, essays, autobiographies, letters, manifestos, paintings, drawings, crafts, and tattoos—are of course less slight now than they were in Poe's day; they make up the greater part of our source material. In addition to work by imprisoned people, readings draw on carceral theory, activist documentation, and the history of criminal justice. Finally, we consider questions raised by noncriminal confinement in U.S. history: slavery, indentured servitude, the reservation system for indigenous peoples, prisoners of war in the Civil War, the wartime internment of Japanese Americans, and carceral and punitive operations of the Immigration and Naturalization Service.

Courses for Advanced Undergraduates

Courses at the 400 level are open to juniors and seniors and to others by permission of instructor unless other prerequisites are noted.

ENGL 401 The Transoceanic Imagination (also ENGL 601 and S HUM 410) (IV)

Fall. 4 credits. E. DeLoughrey.

See S HUM 410 for full course description.

ENGL 402 Literature as Moral Inquiry (IV)

Fall. 4 credits. S. Mohanty.

What can literary works, especially novels and short stories, tell us about moral issues? Should they be seen as suggesting a form of moral inquiry similar to the kind of philosophical discussion we get in, say, Aristotle's *Nicomachean Ethics*? Do they deal with the same range of issues? Can reading philosophical works in ethics together with novels that deal with similar themes help us understand these themes better? This course is an attempt to answer these questions. We read selections from key texts in moral philosophy, including works by Aristotle, Kant, Marx, Nietzsche. Our attempt is to use these works to help us understand the nature of moral debate and inquiry in novels like Eliot's *Middlemarch*, James's *Portrait of a Lady*, Morrison's *Beloved*, Woolf's *Mrs. Dalloway*, Conrad's *Heart of Darkness*, and Achebe's *Things Fall Apart*. Other writers we will probably read include Nadine Gordimer, Doris Lessing, and Kazuo Ishiguro. The emphasis is on close reading, with particular attention to the relationship between formal elements (such as the use of narrative techniques) and the moral questions the texts organize and explore. Assignments include two papers and a journal.

[ENGL 403 Studies in American Poetry: Great Books, 1855–1926 (also AM ST 403) (IV)

4 credits. Next offered 2002–2003.

R. Gilbert.]

ENGL 404 History Into Fiction: Nazis and the Literary Imagination (also COM L 404 and GERST 414) (IV)

Fall. 4 credits. Two papers; no exam.

E. Rosenberg.

The twelve years of Hitler's rule remain the "longest," most critical years of the twentieth century. We read some eight to ten texts by Anglophone and Continental novelists and short-story writers (and a few playwrights and poets) that explore the salient features of the regime: the Weimar background (Thomas Mann's "Disorder and Early Sorrow," Isherwood's *Goodbye to Berlin*); Hitler's rise to power (Mann's "Mario and the Magician," Brecht's *Arturo Ui*, Sartre's "Childhood of a Leader"); civilian life in Nazi Germany (Brecht's "Jewish Wife" and other one-acters, Günter Grass's *Tin Drum*); World War II and the Occupation of Europe (Nabokov's "That in Aleppo Once," Heinrich Böll's short fiction, Camus's *The Plague*); the genocide (Peter Weiss's *The Investigation*, Borowski's *This Way for the Gas*, Ozick's "The Shawl" and "Rosa"; lyrics by Celan, Nelly Sachs, Anthony Hecht). Mondays and Wednesdays are devoted to discussions of the readings; Fridays to twenty-minute oral reports by students on texts dealing with specific topics related to the course, from the Berlin Olympics to the role of the clergy, from Weimar culture to neo-Nazism, from the cult of Richard Wagner to "Aryan" physics, from "autobiographies" of the perpetrators to autobiographies of the survivors. Ancillary materials from the instructor's private documentation of life under the Nazis.

[ENGL 413 Middle English (also ENGL 613) # (IV)

Fall. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. Next offered 2003–2004.]

[ENGL 416 Chaucer and the Politics of Love # (IV)

Spring. 4 credits. This course may be used as one of the three pre-1800 courses required of English majors. Next offered 2002–2003.]

ENGL 417 Early Medieval Archaeology and Literature (also ENGL 617 and ARKEO 417 and 617) # (IV)

Spring. 4 credits. Prerequisite: permission of instructor. This course may be used as one of the three pre-1800 courses required of English majors. R. Farrell.

This course is intended to provide an overview of the early middle ages in what is now called Great Britain. A massive amount of evidence on the material culture has come to light in the past 50 years, evidence which permits us a far better comprehension of written sources. We start with a reading of the great Old English epic *Beowulf* and a close study of the material culture of a society in transition from pagan Germanic to cosmopolitan Christian culture. Our next focus is Bede's *Ecclesiastical History of the English People* and the material evidence for the complex cultural developments in England, Ireland, Scandinavia, and the continent. There are frequent student oral reports, a take-home midterm, and a take-home final OR extended research paper. Graduate students are expected to do more detailed oral reports and research papers.

ENGL 418 Racial Democracy in the Americas (also S HUM 418 and ENGL 613) (IV)

Spring. 4 credits. Z. Nunes.

See S HUM 418 for full course description.

ENGL 424 Spenser (also ENGL 624) # (IV)

Fall. 4 credits. C. Kaske.

This course covers, either in whole or in part, almost all the works Spenser wrote—his epic *The Faerie Queene*, his epithalamion, mock-epyllion, pastorals, picaresque tale in verse, Neoplatonic hymns, sonnet-sequence, and prose colonialist treatise. Spenser has something for everybody. The Bible, Aristotle's *Ethics*, classical pastorals and ethics, medieval romances, and the works of Dante, Chaucer, Petrarch, Ariosto, Tasso, Sidney, and Milton are brought in for comparison. Some attention is given to pedagogy and to rhetoric and versification. Political readings alternate with text-centered, formalist readings. Other concerns are intertextuality, self-contestation, gender, genre, the constructions of the sexually and politically alien, public and private virtues, and the interplay of hierarchical with egalitarian paradigms. Lecture and discussion. Everyone participates in class discussion and writes one brief paper of at least 8 pages; those enrolled for a letter grade also give a brief oral report and write a long paper, preferably on the epic. Open to graduate students and to undergraduate juniors and seniors.

ENGL 429 Adam's Rib and Other Divine Signs: Reading Biblical Narrative (also RELST 429) # (IV)

Spring. 4 credits. L. Donaldson.

One of the most exciting developments in the field of biblical studies has been the introduction of new literary and critical methodologies to the texts of the Jewish and Christian Testaments. Reading the Bible through the lenses of semiotics, new historicism, deconstruction, cultural studies, postcolonialism, and feminism has posed a significant challenge to more traditional modes of biblical interpretation. This advanced undergraduate course introduces students to these new and provocative ways of reading biblical narrative. Rather than covering the entire Bible, the course instead focuses on stories and passages foregrounding specific critical issues. For example, feminist critics have examined why the book of Judges symbolically perpetrates violence against women (through the narratives of the Levite's concubine, Jephthah's daughter and the Benjaminite women), while semioticians have privileged the Judges story of Samson and Delilah. Postcolonial critics have interrogated such passages as Matthew's "great commandment" as well as the Johanine story of the woman at the well, while those in cultural studies have paid particular attention to the construction of a multicultural church in Luke/Acts. In this course, students read portions of Genesis and Exodus, Judges, Ruth, I and II Samuel, and the book of Daniel; from the Christian Testament, we read selections from Mark and Matthew as well as the Gospel of John. Course texts include J. P. Fokkelman, *Reading Biblical Narrative: An Introductory Guide*; Mieke Bal, *Lethal Love: Feminist Literary Readings of Biblical Love Stories*; Gale A. Yee, ed., *Judges & Method: New Approaches in Biblical Studies*; R.S. Sugirtharajah, ed., *The*

Postcolonial Bible; and selected essays by Robert Alter, Musa Dube, Laura Donaldson, Yairah Amit, Stephen Moore and the Bible and Culture Collective.

ENGL 430 Literature As History: The Americas (also AM ST 430.03) (IV)
Fall. 4 credits. B. Maxwell.
See AM ST 430.03 for full course description.

ENGL 434 Electronic Art and Culture (IV)
Fall. 4 credits. This course may be counted toward the Visual Studies major. Prerequisite: permission of instructor. Requirements: 2 medium length papers (7–8 pages), visual project (hypertext or image), seminar presentation. Some advanced knowledge of either the artistic or theoretical context is helpful. T. Murray.
The course analyzes the "interface" between recent projects in electronic art and theories of digital culture. Artifacts studied include video and audio installations, web art, CD-Rom art, and digitized cinema. We study both process and content with an emphasis on the role of historical and ideological representation in the works discussed. Special consideration is given to issues such as memory, sexuality, cultural identity, and virtuality. Theorists read include: Bellour, Mercer, Rodowick, Zimmermann, Druckrey, Kroker, Virilio, Morse, Hershman, and Gomez-Pena. Artists to be studied, including, Piper, Stelarc, Woolery, Tamblyn, Marker, McCoys, Shaw, Oursler; can be previewed at: http://contactzones.cit.cornell.edu/.

ENGL 437 Fiction(s) of Race, Fact(s) of Racism: Perspectives from South African and Afro-American Literatures @ (IV)
Spring. 4 credits. B. Jeyifo.
This course examines works of South African and Afro-American **fiction** and **drama** in light of the powerful claim that "race" is a socially constructed fiction with no scientific, rationally provable basis to it. The works explored in the course also see race as a fiction, but consistent with the dialectics of artistic representation, they juxtapose the fiction of race to the fact(s) of racism to pose the fundamental question: Can we imagine a time, a place, a world where racism, like "race," will become fiction? Authors examined include Baraka, Morrison, Naylor, August Wilson, Gordimer, Nkosi, Fugard, and Coetzee.

[ENGL 439 Austen in the Eighteenth Century # (IV)
4 credits. Next offered 2002–2003.]

[ENGL 443 The Dandy in London and Dublin # (IV)
4 credits. Next offered 2002–2003.
S. Siegel.]

ENGL 446 Victorian Poetry # (IV)
Spring. 4 credits. D. Mermin.
Reading of poems by Tennyson, Elizabeth Barrett Browning, Robert Browning, Matthew Arnold, Emily Brontë, Christina Rossetti, Swinburne, and others. Since women made their first serious inroads into the poetic canon during this period, while gender categories became problematic for both male and female poets, we pay particular attention to issues of gender and sexuality. We also think about the relation of poetry to religion, science, and social change; colonialism; the sources of cultural authority; and the way all these matters are reflected in genre and style.

[ENGL 448 The American Short Story (IV)
Fall, spring, or summer. 4 credits. Next offered 2002–2003.]

[ENGL 452 Wilde and Woolf: On Style (also ENGL 652) (IV)
4 credits. Next offered 2002–2003.
S. Siegel.]

ENGL 454 American Musical Theatre (also MUSIC 490 and THETR 454) (IV)
Spring. 4 credits. Prerequisite: ENGL 272 or THETR 240–241 plus some ability to read music. Limited to 15 students. S. McMillin.
A close reading of some seven or eight leading examples of the American musical, together with their sources, from *Showboat* to *Sweeney Todd*. A chronological approach gives a historical basis to the course, but the primary concern is learning how to analyze musical drama and how to handle the problems and opportunities of interpretation integral to this complex theatrical form. Readings include Kern and Hammerstein's *Show Boat* and its source, Edna Ferber's novel of the same name; Rogers and Hammerstein's *Oklahoma!* and its source, Lynn Riggs' *Green Grow the Lilacs;* Loesser and Burrows' *Guys and Dolls* and its source, stories by Damon Runyon; Bernstein and Sondheim's *West Side Story* and its source, Shakespeare's *Romeo and Juliet*; Kander and Ebb's *Cabaret* and its source, Isherwood's *Berlin Stories*.

ENGL 456 Postmodern Novel (also ENGL 656) (IV)
Fall. 4 credits. M. Hite.
Experimental fiction written between 1962 and 1988, ranging from the encyclopedic (Thomas Pynchon's *Gravity's Rainbow*, Doris Lessing's *The Golden Notebook*) to the gnomic (some of Borges' *Ficciones*, stories by John Barth and Angela Carter). Other novels include Bellow's *Herzog*—taken as an example of a contemporary novel that is *not* postmodernist—Margaret Atwood's *Lady Oracle* and Robert Coover's *The Universal Baseball Association*. We are particularly concerned with ways in which these fictions address conventions of realism and modernism, with the strategies of reading that they elicit or seem to elicit, and with questions of canonicity and gender.

ENGL 458 Imagining the Holocaust (also ENGL 658, JWST 458 and 658, COM L 483 and 683) (IV)
Spring. 4 credits. D. Schwarz.
What is the role of the literary imagination in keeping the memory of the Holocaust alive for our culture? We examine major and widely read Holocaust narratives which have shaped the way we understand and respond to the Holocaust. As we move further away from the original events, why do the kinds of narratives with which authors render the Holocaust horror evolve to include fantasy and parable? Employing both a chronological overview and a synchronic approach—which conceives of the authors having a conversation with one another—we discover recurring themes and structural patterns in the works we read.

We begin with first person reminiscences—Wiesel's *Night*, Levi's *Survival at Auschwitz*, and *The Diary of Anne Frank*—before turning to searingly realistic fictions such as Hersey's *The Wall*, Kosinski's *The Painted Bird*, and Ozick's "The Shawl." In later weeks, we explore diverse kinds of fictions and discuss the mythopoeic vision of Schwarz-Bart's *The Last of the Just*, the illuminating distortions of Epstein's *King of the Jews*, the Kafkaesque parable of Appelfeld's *Badenheim 1939*, and the fantastic cartoons of Spiegleman's *Maus* books. We shall also include Kineally's *Schindler's List*, which was the source of Spielberg's academy award winning film, and compare the book with the film.

ENGL 459 Contemporary British Drama (IV)
Spring. 4 credits. S. McMillin.
English theatre in the second half of the twentieth century, with special attention to Tom Stoppard (*Arcadia, Rosencrantz and Guilderstern are Dead*), Harold Pinter (*The Homecoming, Mountain Language, Moonlight*), and Caryl Churchill (*Cloud Nine, Top Girls*), along with plays by Sarah Kane, David Edgar, Michael Frayn, Edward Bond, and Peter Shaffer. The importance of the Royal Court Theatre, the effect of The National Theatre and The Royal Shakespeare Company, the role played by the Fringe, and the political impact of Thatcherism and its aftermath are important considerations.

[ENGL 460 Riddles of Rhythm (IV)
4 credits. Next offered 2002–2003.
D. Fried.]

ENGL 461 Asian Americans and Popular Culture (also AAS 461) (IV)
Fall. 4 credits. S. Davé.
This course examines how Asian Americans are represented and represent themselves in American forms of popular culture such as literature, television, film, print media, and various other forms of modern culture. We will explore the cultural contexts of the term "Asian American" that define its visibility and marketability in contemporary times. Some questions we will address include: Is there an Asian American aesthetic and if so, how is it characterized? What are the consequences of the consumption of ethnic products by a mainstream audience? What are the ramifications of mass marketing for Asian American writers, producers, and artists?

[ENGL 462 Between Aztlan and Queens: Latina Culture and the Making of Space (also LSP 462) (IV)
4 credits. Next offered 2002–2003.
M. P. Brady.]

[ENGL 464 Emerson and Poe (IV)
4 credits. Next offered 2002–2003.
R. Morgan.]

ENGL 466 James on Film (IV)
Spring. 4 credits. D. Fried.
Study of selected films adapted from Henry James's novels involves close reading of the novels and detailed analysis of the films, with a constant eye to the different ways moviegoers and readers make sense of stories. James's aspirations as a dramatist, his writings on theater and photography, and controversies about the interpretation of the novels are also important in exploring how James's stories have been retold by filmmakers. The aim of the course is not to determine whether James has been justly served by the movies, but to consider what novels adapted to films can tell us about the conventions and resources peculiar to film and to prose fiction. Recurrent issues include authorship and authority, point of view, levels of representation, visual and verbal style, the camera as storyteller, acting and character, literary and filmic allusion, and relations between literature and the other arts. Works and films may include *Daisy Miller, The Turn of the Screw/The Innocents, Washington*

Square/The Heiress, The Bostonians, and *The Portrait of a Lady*. To highlight the idiosyncratic problems of using Jamesian prose as the basis for film, there may be some attention to film adaptations of fiction by Edith Wharton and others.

ENGL 468 Baldwin, Brooks, and Baraka (IV)
Spring. 4 credits. K. McClane.
An in-depth analysis of the writings of Gwendolyn Brooks, James Baldwin, and Amiri Baraka, focusing on the aesthetic, political, and social importance of, arguably, the three most significant African American writers of the last 50 years. Readings include Brooks's *In The Mecca* and *Selected Poems*; Baldwin's *The Fire Next Time, If Beale Street Could Talk, Another Country* and *Just Above My Head*; and Baraka's *The Dead Lecturer, Tales, The Dutchman* and *Transbluesency*.

ENGL 469 Faulkner (also AM ST 469) (IV)
Fall. 4 credits. H. Spillers.
This course examines selected writings of William Faulkner, beginning with some of the early novels (*The Sound and the Fury, Light in August, Absalom, Absalom!*) and concluding with *A Fable*. We will consider Faulkner's impact as a maker of myth and as one of the leading figures of a literary discourse that creates a modernist sensibility in American letters. As a southern writer, Faulkner is traditionally confined to the character study of exotic types, but his systemic fictional exploration of "violence and the sacred" provides a powerful clue to the larger issue of a national identity. Faulkner, in his own terms, dared to imagine "culture" as a problem for fiction. This course considers the outcome.

ENGL 470 Studies in the Novel: Forms of American Fiction: The Short Story Collection as Novel (also AM ST 470) (IV)
Fall. 4 credits. Limited to 20 students. L. Herrin.
The claim has been made that the modern short story originated with Edgar Allen Poe and as such represents America's contribution to world letters. I have my doubts about that claim, but lately I have been struck by the number of books of stories that seem to want to be read as novels, and I've begun to wonder if this might be a peculiarly American literary phenomenon. These books of linked stories span the twentieth century, from Sherwood Anderson's *Winesberg, Ohio* to Denis Johnson's *Jesus' Son*. Some of our most famous authors (Hemingway, Faulkner, Welty) have worked in this undeclared genre. (Others who could be considered are Katherine Anne Porter, Harold Brodkey, Grace Paley, Louise Erdrich, and Tim O'Brien.) In this course we read nine or ten of them with an eye to what is gained and what is lost when stories are collected and considered in this manner. Students are expected to read the works carefully, contribute to class discussion, and write wise, speculative essays.

[ENGL 475 Studies in the Twentieth Century: Writers' Writers in Twentieth-Century Literature (IV)
4 credits. Limited to 20 students. Next offered 2002–2003. L. Herrin.]

[ENGL 476 Global Women's Literature (also WOMNS 476) (IV)
4 credits. Next offered 2002–2003.]

[ENGL 477 Studies in Native American Literature: Native American Literature and Criticism (also ENGL 677) (IV)
4 credits. Next offered 2002–2003. Staff.]

[ENGL 479 Jewish-American Writing (also AM ST 479 and JWST 478) (IV)
4 credits. Next offered 2002–2003. J. Porte.]

ENGL 480–481 Seminar in Writing (IV)
Fall, 480; spring 481. 4 credits.
See complete description in section headed Creative Writing.

[ENGL 483 Seminar in Comparative Twentieth-Century Anglophone Drama (IV)
4 credits. Next offered 2002–2003. B. Jeyifo.]

ENGL 487 Writing About Literature (IV)
Fall. 4 credits. F. Bogel.
Why do we write about literature and "interpret" it instead of just "reading" it? Are some interpretations better than others? Truer? If there are many different modes of criticism, does the field of "English" have a coherent identity? This course does not conduct a broad survey of theories but investigates a few critical approaches and attempt to apply them practically to a small selection of literary texts. The aim is less an acquaintance with theory than an enlargement of critical possibilities and a reflection on the undertaking of literary interpretation itself. The critical schools explored include a few of the following: New Criticism (American Formalism), structuralism, deconstruction, feminism, New Historicism, and the literary critical/rhetorical analyses of Kenneth Burke. Literary texts will likely include a Shakespeare play, a variety of lyric poems, and several short stories.

[ENGL 490 Literatures of the Archipelagoes: Caribbean and Pacific "Tidalectics" @ (IV)
4 credits. Next offered 2002–2003. E. DeLoughrey.]

ENGL 491 Honors Seminar I
Fall. 4 credits. Open to students in the Honors Program in English or related fields, or by permission of instructor. S. McMillin.
Early Shakespeare. Close reading of major texts, intended to introduce the critical and scholarly questions important in Shakespeare studies today. Readings include such plays as *Midsummer Night's Dream, Merchant of Venice, Henry IV* Parts One and Two, *Henry V, Othello, King Lear, Winter's Tale*. Assignments fall at the rate of about one play and one critical essay per week. Reports, short papers, a term paper.

ENGL 492 Honors Seminar II
Spring. 4 credits. Open to students in the Honors Program in English or related fields, or by permission of instructor.

Section I: Reading Joyce's *Ulysses* D. Schwarz.
A thorough, episode-by-episode study of the art and meaning of Joyce's *Ulysses*. We explore the relationship between it and the other experiments in modernism and show how *Ulysses* redefines the concepts of epic and hero. We also view *Ulysses* to address major issues in literary study and to test various critical and scholarly approaches. Such a self-conscious inquiry into theories and methods should prepare students to confront other complex texts, as well as help them define their own critical positions as they plan their senior honors theses.

Section II: Women and the Novel Form L. Brown.
This course raises central questions about the role of gender in the study of literature by exploring the development of the female-authored novel from the seventeenth to the twentieth century. Readings include Aphra Behn's *Oroonoko*, Fanny Burney's *Evelina*, Jane Austen's *Emma*, Charlotte Brontë's *Jane Eyre*, Virginia Woolf's *A Room of One's Own* and *Mrs. Dalloway*, and Toni Morrison's *Sula*. These works raise issues of race and slavery, love and marriage, sexuality and homosexuality, history and women's history, and writing itself. Students in the class will work together to develop strong close readings of the texts and to explore the contexts in which they were written. These discussions are the basis for an evolving assessment of the status of a work authored by a woman. Is it shaped in a distinctive way? Does it evoke a specific response? Does it register an unusual apprehension of the psyche? Does it display a unique relation to sexuality? Does it intersect with its context, or with history, in a particular or unconventional fashion? Does it have a special relation to language, ideology, or culture? Students are asked to participate in discussion, and to write two short papers and a final research paper.

ENGL 493 Honors Essay Tutorial I
Fall or spring. 4 credits. Prerequisites: senior standing and permission of Director of the Honors Program.

ENGL 494 Honors Essay Tutorial II
Fall or spring. 4 credits. Prerequisites: English 493 and permission of Director of the Honors Program.

ENGL 495 Independent Study
Fall or spring. 2–4 credits. Prerequisites: Permission of departmental adviser and director of undergraduate studies.

ENGL 496 Decolonizing Identities and Values (IV)
Spring. 4 credits. S. Mohanty.
A close analysis of four novelists who have written, directly or indirectly about the theme of decolonization: Chinua Achebe, Toni Morrison, Salman Rushdie, and Leslie Marmon Silko. Our focus is on the decolonization of social and cultural identities, and the values that accompany the colonized identities as well as the process of decolonization. Selected theoretical readings on decolonization and identity will help inform and orient our discussions, but much of the time is spent pursuing close readings of a few novels and developing frameworks for comparative analyses of the aesthetic and socio-political visions of these writers. Two papers required, one 6–8 pages, and one 14–18 pages.

Courses Primarily for Graduate Students

Permission of the instructor is a prerequisite for admission to courses numbered in the 600s. These are intended primarily for graduate students, although qualified undergraduates are sometimes admitted. Undergraduates seeking admission to a 600-level course should consult the instructor. The list of courses given below is illustrative only; a definitive list, together with course

descriptions and class meeting times, is published in a separate department brochure before course enrollment each term.

Graduate English Courses for 2001–2002

Fall

ENGL 600 Colloquium for Entering Students
M. Hite.

ENGL 601 The Transoceanic Imagination (also ENGL 401 and S HUM 410)
E. DeLoughrey.

ENGL 602 Literature and Theory (also ENGL 302 and COM L 302/622)
J. Culler.

ENGL 611 Old English (also ENGL 311)
R. Farrell.

ENGL 619 Chaucer
W. Wetherbee.

ENGL 624 Spenser (also ENGL 424)
C. Kaske.

ENGL 627 Shakespeare: Shakespeare and the Theatre
S. McMillin.

ENGL 635 Native Encounters: 1660–1914
L. Brown and L. Donaldson.

ENGL 639 Studies in Romantic Literature: Byron, Hazlitt, Shelley, Keats, and the Issues of Romanticism
R. Parker.

ENGL 644 Studies in Victorian Poetry
J. Adams.

ENGL 656 Postmodern Novel
M. Hite.

ENGL 663 American Fiction 1880–1918
J. Porte.

ENGL 669 Narrative and Queer Sexuality: An Introduction
K. McCullough.

ENGL 698 Broken English: English Literature in a Postcolonial/ Postmodern Frame
B. Jeyifo.

ENGL 780.01 MFA: Poetry Seminar
K. McClane.

ENGL 780.02 MFA: Fiction Seminar
M. McCoy.

ENGL 785 Reading for Writers
A. Lurie.

Spring

ENGL 607 Dante's Divine Comedy (also ITAL 427/627)
W. Wetherbee.

ENGL 612 *Beowulf*
T. Hill.

ENGL 613 Racial Democracy in the Americas (also S HUM 418 and ENGL 418)
Z. Nunes.

ENGL 617 Early Medieval Archaeology and Literature (also ENGL 417, ARKEO 417/617
R. Farrell.

ENGL 626 The Literature of Empire in the Renaissance (also COM L 665)
W. Cohen.

ENGL 629 Milton
G. Teskey.

ENGL 631 Politics and the Passions: Hobbes to Rousseau (also COM L 631)
N. Saccamano.

ENGL 634 A Thousand Points of Language: The Diaspora of "The New Criticism"
F. Bogel.

ENGL 657 Twentieth Century Experimental Novel
M. Hite.

ENGL 658 Imagining the Holocaust (also ENGL 458, JWST 458/658, COM L 483/683, GERST 457/657)
D. Schwarz.

ENGL 661 Finding America: Sex, Race, and Conquest in Early Narratives
S. Samuels.

ENGL 664 Studies in American Poetry: Walt Whitman and the Twentieth Century
R. Gilbert.

ENGL 676 Theory and Poetics of the Novel
H. Shaw.

ENGL 696 Decolonizing Identities and Values
S. Mohanty.

ENGL 699 Studies in African American Literature: Black Women Writing at the Intersection
H. Spillers.

ENGL 703 Theorizing Film
T. Murray.

ENGL 710 Advanced Old English
T. Hill.

ENGL 781.01 MFA: Poetry Seminar
A. Fulton.

ENGL 781.02 MFA: Fiction Seminar
L. Herrin.

ENGLISH FOR ACADEMIC PURPOSES

D. Campbell, director; S. Schaffzin, F-H Yap

Note: Courses and credits do not count toward the B.A. degree.

ENGLF 205 English as a Second Language
Fall. 4 credits. Prerequisite: placement by examination. S. Schaffzin.
An all-skills course emphasizing listening and speaking, with some writing practice. Students also meet individually with the instructor.

ENGLF 206 English as a Second Language
Spring. 3 credits. Prerequisite: ENGLF 205 or placement by examination. S. Schaffzin.
A writing class for those who have completed ENGLF 205 and need further practice, or for those who place into the course. Individual conferences are also included.

ENGLF 209 English as a Second Language
Fall or spring. 1 credit. Prerequisite: permission of instructor. S. Schaffzin.
Practice in classroom speaking and in informal conversational English techniques for gaining information. Students also practice giving informal presentations. Individual conferences with the instructor supplement class work.

ENGLF 210 English as a Second Language
Spring. 1 credit. Prerequisite: permission of instructor. S. Schaffzin.
Practice in academic speaking. Formal classroom discussion techniques and presentation of information to a group. Presentations are videotaped and reviewed with the instructor. Individual conferences supplement class work.

ENGLF 211 English as a Second Language
Fall, spring, or summer. 3 credits. Prerequisite: placement by examination. D. Campbell.
Academic writing with emphasis on improving organization, grammar, vocabulary, and style through the writing and revision of short papers relevant to students' fields. Frequent individual conferences supplement class work.

ENGLF 212 English as a Second Language
Spring. 3 credits. Prerequisite: permission of instructor. Enrollment is restricted to 12 on a first-come, first-served basis. D. Campbell.
Research paper writing. For the major writing assignment of this course, the students must have a real project that is required for their graduate work. This can be a thesis proposal; a pre-thesis; part of a thesis, such as the literature review or discussion section; a paper for another course or a series of shorter papers (with permission of the other instructor); or a paper for publication. Time limitations make it difficult to deal with work over 20 pages in length. Course work involves practice in paraphrase, summary, the production of cohesive, coherent prose, vocabulary use, and grammatical structure. Frequent individual conferences are a necessary part of the course. Separate sections for Social Sciences/Humanities and for Science/Technology.

ENGLF 213 Written English for Non-Native Speakers
Spring. 3 credits. Prerequisite: permission of instructor. S. Schaffzin.
Designed for those whose writing fluency is sufficient for them to carry on regular academic work but who want to refine and develop their ability to express themselves clearly and effectively. Individual conferences supplement class work.

First-Year Writing Seminar

ENGLB 115–116 English for Later Bilinguals
For description, see first-year writing seminar brochure.

INTENSIVE ENGLISH PROGRAM

105 Morrill Hall

J. M. Mancusi, director; E. J. Beukenkamp, R. L. Feldman, K. U. Golkowska, M. Johns, M. T. Lovell, J. G. Luks, L. Porterfield, S. L. Vann, S. Yates

This noncredit, nondegree program provides full-time intensive English as a second language instruction as well as academic, social, and cultural orientation to the United States and its institutions. The aim of the program is for participants to acquire proficiency in the language in order to pursue goals in English for academic, business, professional, or personal purposes.

Programs are offered both fall and spring semesters and in the six-week summer session (from late June to early August). Participants receive a minimum of 20 hours of classroom instruction weekly in speaking, listening, reading, writing, and grammar, which are taught at all levels from low intermediate through very-high advanced. Applicants must be at least 17 years of age, hold the equivalent of a high school diploma, and have had some previous study of English. Participants receive a Certificate of Eligibility (Form I-20) to obtain an F-1 visa.

Students who have gained full admission to or who are already registered in degree-granting programs at Cornell should consult the section "English for Academic Purposes" (series ENGLF).

The Intensive English Program is coordinated by the director, Jeanette Mancusi. Information and application materials are available directly from the program at: Cornell University, Intensive English Program, Morrill Hall, Ithaca, NY 14853–4701, U.S.A.: tel. 607/255–4863; fax 607/255–7491; e-mail CUIEP@cornell.edu; web page: http://languagecenter.cornell.edu/iep/

FILM

See Department of Theatre, Film and Dance.

FRENCH

See Romance Studies.

FIRST-YEAR WRITING SEMINARS

For information about the requirements for writing seminars and descriptions of seminar offerings, see "Special Programs and Interdisciplinary Studies" at the end of the Arts and Sciences section of this catalog and consult the John S. Knight Institute brochure, available from college registrars in August for the fall term and on the web in October at www.arts.cornell.edu/knight_institute for the spring term.

GERMAN STUDIES

L. Adelson, chair; P. Gilgen, director of undergraduate studies; A. Schwarz, director of graduate studies; D. Bathrick, M. Briggs (Dutch), B. Buettner, H. Deinert, I. Ezergailis (Emerita), A. Groos, P. U. Hohendahl, G. Lischke, B. Martin, L. Trancik (Swedish), G. Waite

The Department of German Studies offers students a wide variety of opportunities to explore the literature and culture of German-speaking countries, whether as part of their general education, a major in German Studies, or a double major involving another discipline, or as preparation for graduate school or an international professional career. Courses are offered in German as well as in English translation; subjects range from medieval to contemporary literature and from film and visual culture to intellectual history, music, history of psychology, and women's studies.

The department's offerings in English begin with a series of First-Year Writing Seminars introducing various aspects of German literature (the fairy-tale and romantic consciousness, twentieth-century writers such as Kafka, Hesse, Mann, Brecht), theorists such as Marx, Nietzsche and Freud, issues in mass culture and modernity, problems of German national identity/ies, and cinema and society. Courses in English translation at the 300 and 400 levels explore such topics as the Faust legend, aesthetics from Kant to Heidegger, Freud and his legacy, opera from Mozart to Strauss, the German novel, political theory and cinema, the Frankfurt School, and feminist theory. It may be possible to arrange a German section for courses taught in English, either informally or formally (for credit). Students are encouraged to discuss this possibility with instructors.

Students wishing to begin German language at Cornell enroll in GERST 121–122, 123 (elementary language level). Students then continue with intermediate level courses, which provide further grounding in the language as well as introduce German literature and cultural studies. The sequence GERST 205–206 provides language instruction for business German leading to certification. On the advanced level (300 level or above), we offer thematically oriented courses that include intensive grammar review (301, 302, 306); literature and culture study courses in German, including the Senior Seminar; and seminars of interdisciplinary interest taught in English. Addressing a broad spectrum of topics in German culture, our courses at the advanced level appeal to German majors and other qualified students alike.

(Note: beginning in spring 1998, GERST 201 and GERLA 203 were placed by GERST or GERLA 200.)

Sequence of courses

Courses in German:

Elementary level: GERST 121–122, after completion, placement into GERST 123 or 200, 205

Intermediate level: GERST 200, 202, 204, and 205–206

Advanced level: GERST 301, 302, 306, 307, 410.

Courses in German or English:

Further 300- and 400-level literature and culture courses (see course descriptions)

Advanced Standing

Students with an AP score of 4 or better are automatically granted three credits in German. Students with an AP score of 4 or better, an LPG score of 65 or higher, or an SAT II score of 680 or higher must take the CASE examination for placement in courses above GERST 200. Students coming to Cornell with advanced standing in German and/or another subject are encouraged to consider a double major and to discuss the options with the director of undergraduate studies as early as possible.

The Majors

The department offers two options for the major: German literature and culture, and German area studies. The latter is a more broadly defined sequence that includes work in related disciplines. The course of study in either major is designed to give students proficiency in reading, speaking, and writing in German, to acquaint them with German culture, and to help them develop skills in reading, analyzing, and discussing German texts in relevant disciplines. For both majors, there is a wide variety of courses co-sponsored with other departments (Comparative Literature; Government; History; Music; Theatre, Film, and Dance; Women's Studies).

The department encourages double majors and makes every effort to accommodate prospective majors with a late start in German. Students interested in a major should consult the director of undergraduate studies, Peter Gilgen, 192 Goldwin Smith Hall.

German (Literature and Culture)

Although the emphasis of this track is on literature, majors may also pursue individual interests in courses on film and visual culture, theater and performing arts, music, intellectual and political history, and women's studies that have a substantial German component. Please consult with the director of undergraduate studies.

Admission: By the end of their sophomore year, prospective majors should have successfully completed GERST 202, 220, 204, or 206.

To complete the major, a student must:

1. Demonstrate competence in the German language by successful completion of two 300-level courses with intensive language work (GERST 301, 302, or 306) or the equivalent.
2. Complete six courses in German Studies at the 300 level or above. One of these must be the Senior Seminar (GERST 410).

German Area Studies

Students select courses from the Department of German Studies as well as courses with a substantial German component from other departments, such as Comparative Literature; Government; History; Music; Theatre, Film, and Dance; and Women's Studies.

Admission: By the end of their sophomore year, prospective majors should have successfully completed GERST 202, 220, 204, or 206.

To complete the major, a student must:

1. Demonstrate competence in the German language by successful completion of two 300-level courses with intensive language work (GERST 301, 302, or 306) or the equivalent.
2. Complete six courses with a substantial German component at the 300 level or above. Three of these must be in German Studies, including the Senior Seminar (GERST 410).
3. Select a committee of one or more faculty advisers to help formulate a coherent program of study. One of the advisers must be from the Department of German Studies.

Study Abroad in Germany

German Studies strongly supports Study Abroad as an opportunity for students to put their German to use by living and studying in the German cultural context. The experience of living abroad promotes enduring personal growth, provides new intellectual perspectives through cultural immersion, and opens up academic and professional opportunities.

Students interested in studying abroad are encouraged to consider the Berlin Consortium, of which Cornell is an associate member. The program is run in conjunction with the Free University of Berlin and is of very high caliber. Six weeks of an intensive language practicum held at the center of the consortium are followed by one or two semesters of study at the university. Participants enroll in regular courses at the university. Academic-year students have been assisted in finding internships between semesters. Prerequisite for participating in the program is five semesters of German language study, of which the last course must be on the 300 level.

Students interested in this or other study abroad options in Germany, Austria, or Switzerland should consult Gunhild Lischke (G75 Goldwin Smith; 255–0725; gl15@cornell.edu) as soon as possible.

Honors

Eligibility: A student wishing to receive honors in German Studies must have a GPA of 3.5 in all courses relevant to the major.

Committee: Candidates for honors form an advisory committee consisting of an adviser from German Studies and at least one additional faculty member.

Honors essay: During the first term of their senior year, students determine the focus of their honors essay through an appropriate course, GERST 453, under the direction of their advisers. During the second term they complete an honors essay, GERST 454, which will be evaluated by the committee.

Determination of honors: An oral examination concludes the process. Honors is determined by the essay, the exam, and grades in the major.

First-Year Writing Seminars

Consult the John S. Knight Institute brochure for course times, instructors, and descriptions.

Courses Offered in German

Note: All courses are now designated GERST. In earlier years courses were designated either GERLA or GERST. Course numbers remain the same.

GERST 121 Elementary German I
Fall or spring. 4 credits. Intended for students with no prior experience in German or with a language placement test (LPG) score below 37, or an SAT II score below 370. G. Lischke and staff.
Students develop basic abilities in listening, reading, writing, and speaking German in meaningful contexts through interaction in small group activities. Course materials including videos, short articles, poems, and songs provide students with varied perspectives on German language, culture, and society.

GERST 122 Elementary German II
Fall or spring. 4 credits. Prerequisite: GERST 121, LPG score 37–44, or SAT II 370–450. Students who obtain an LPG score of 56 or above after GERST 122 attain qualification and may enter a 200-level course; otherwise successful completion of GERST 123 is required for qualification. G. Lischke and staff.
Students build on their basic knowledge of German by engaging in intense and more sustained interaction in the language. Students learn more advanced language structures allowing them to express more complex ideas in German. Discussions, videos, and group activities address topics of relevance to the contemporary German-speaking world.

GERST 123 Continuing German
Fall or spring. 4 credits. *Provides language qualification.* Limited to students who have previously studied German and have an LPG score 45–55 or SAT II 460–570. Staff.
Students continue to develop their language skills by discussing a variety of cultural topics and themes in the German-speaking world. The focus of the course is on expanding vocabulary, reviewing major grammar topics, developing effective reading strategies, improving listening comprehension, and working on writing skills. Work in small groups increases each student's opportunity to speak in German and provides for greater feedback and individual help.

GERST 200 Contemporary Germany (formerly also GERLA 200) (IV)
Fall or spring. 3 credits. *Provides language proficiency.* Prerequisite: qualification in German (GERST 123 or LPG score of 56–64 or SAT II score of 580–670) or placement by examination. Staff.
A content-based language course on the intermediate level. Students examine important aspects of present-day German culture while expanding and strengthening their reading, writing, and speaking skills in German. Materials for each topic are selected from a variety of sources (fiction, newspapers, magazines, and the Internet). Units address a variety of topics including studying at a German university, modern literature, Germany online, and Germany at the turn of the century. Oral and written work and individual and group presentations emphasize accurate and idiomatic expression in German. Successful completion of the course enables students to continue with more advanced courses in language, literature, and culture.

GERST 202 Exploring German Literature (IV)
Fall or spring. 3 credits. Prerequisite: GERST 200 or equivalent or permission of instructor. Taught in German. Staff.
In this intermediate course, we read and discuss a number of works belonging to different literary genres by major German-speaking authors such as Kafka, Walser, Brecht, Mann, Frisch, Dürrenmatt, Bachmann, and others. We explore questions of subjectivity and identity in modern society, of human existence as existence in language, and of the representation of history in literary texts. Activities and assignments in this course focuses on the development of reading competency in different literary genres, the use of accurate and idiomatic expressions, the expansion of students' German vocabulary, and the systematic review of select topics in German grammar.

GERST 204 Intermediate Conversation and Composition
Fall or spring. 3 credits. Prerequisite: GERST 200 or GERST 201 or GERST 205 or placement by examination (placement score and CASE). Staff.
Emphasis is on improving oral and written expression of idiomatic German. Enrichment of vocabulary and appropriate use of language in different conversational contexts and written genres. Material consists of readings in contemporary prose, articles on current events, videos, and group projects. Topics include awareness of culture, dependence of meaning on perspective, interviews with native German speakers, German news broadcasts, reading German newspapers on the Internet.

GERST 205 Business German I
Fall. 3 credits. *GERST 205 provides language proficiency.* Prerequisite: qualification in German (GERST 123, or an LPG score of 56–64, or an SAT II score between 580–670). G. Lischke.
Learn German and understand German business culture at the same time. This is a German language course that examines the German economic structure and its major components: industry, trade, the banking system, and the government. Participants learn about the business culture in Germany and how to be effective in a work environment, Germany's role within the European Union, the dual education system, the importance of trade and globalization, and current economic issues in Germany. The materials consist of authentic documents from the German business world, TV footage, and a Business German textbook.

GERST 206 Business German II
Spring. 3 credits. Prerequisite: proficiency in German (GERST 205, 200, 201, or placement by examination [placement score and CASE]). G. Lischke.
This course is a continuation of GERST 205; however students without previous knowledge of Business German are welcome. This is a German language course that examines the German economic structure and its major components: industry, trade unions, the banking system, and the government. Participants learn about the business culture in Germany and how to be effective in a work environment, Germany's role within the European Union, the role of the European Central Bank, the importance of trade and globalization, and current economic issues in Germany. The materials consist of authentic documents from the German business world, TV footage, and a Business German textbook. At the end of the course, the external Goethe Institut exam "Deutsch für den Beruf" will be offered.

[GERST 220 Was ist Deutsch? (IV)
Provides language proficiency. Not offered 2001–2002. B. Buettner.]

GERST 301 Scenes of the Crime: German Mystery and Detective Fiction (IV)
Fall. 4 credits. Prerequisite: GERST 202, 220, 204, 206 or equivalent, or permission of instructor. Taught in German. This course may be counted towards the requirement for 300-level language work in the major. P. Gilgen.
An exploration of German crime, detective, and mystery writing in texts ranging from the early nineteenth century to contemporary fiction. Authors to be studied may include:

Kleist, E. T. A. Hoffmann, Dürrenmatt, Schatten, Süskind, Handke, and Ören. In addition to exercising hermeneutic skills (and, by extension, that gray matter of which Sherlock Holmes was so fond), this course aims at improving proficiency in aural and reading comprehension, as well as speaking and writing skills, with emphasis on vocabulary expansion, advanced grammar review, and stylistic development. Recommended to students interested in a combined introduction to literature and high-level language training. The follow-up course, GERST 302, Youth/Adolescence, is taught in the spring only.

GERST 302 Youth Culture: Adolescence in German Fiction (IV)
Spring. 4 credits. Prerequisite: GERST 202, 220, 204, 206 and 301 or equivalent or permission of instructor. Taught in German. P. Gilgen.
Examination of literary and cultural approaches to childhood, youth, and adolescence in texts ranging from the late eighteenth century to the present. Authors include: Hoffmann, Keller, Goethe, Mann, Walser, Musil, Zweig, Handke, and Kaschnitz. Aimed at further improving students' proficiency in aural and reading comprehension, as well as in speaking and composition skills. Focus on high-level grammar review, stylistic and expository refinement and vocabulary expansion. Recommended for students wishing to combine intensive language training with reading and discussion of short fiction.

[GERST 303 Advanced Conversation and Composition
Not offered 2001–2002.]

[GERST 304 Advanced Conversation and Composition
Not offered 2001–2002.]

[GERST 306 German Media
Not offered 2001–2002.]

GERST 307 After the Fires: Divided Germany 1945–1989 (IV)
Fall. 4 credits. Prerequisite: GERST 202, or GERST, or GERLA 204, or GERST 220, or equivalent or permission of instructor. Taught in German. L. Adelson.
Introduction to the history of postwar Germany, the development and unification of the two Germanys, and their societies. The emphasis is on cultural and social institutions as well as political and intellectual debates. Focal topics include responses to the Nazi past, Germany and Europe, protest movements, migration patterns, women, mass media, and popular culture. We consider the changes taking place in Germany today in light of the recent past. Some films are also shown.

GERST 319 Laughter in German Literature (IV)
Spring. 4 credits. Prerequisites: GERST 202 or 204 and 301 or equivalent or permission of instructor. Required readings and class discussion in German. P. Rehberg.
This course explores the sometimes subterranean tradition of the comical in modern German literature and thought. The literary work of Franz Kafka and traditional responses to it are considered in unconventional ways. What happens when readers take the unserious seriously? Discussion and humorous elements in Kafka's work will additionally serve as a springboard for considering the possible relationship between comedy and modernity in broad historical terms. Required readings are drawn from three key periods of German literature: Romanticism, early twentieth century, and Postmodernism. Laughter in works by authors as diverse as Friedrich Schlegel, Sigmund Freud, Robert Musil, and Thomas Bernhard are addressed. Comical phenomena and stylistic media such as irony, jokes, and laughter are compared and contrasted.

[GERST 353 Kleist # (IV)
Not offered 2001–2002.]

[GERST 354 Schiller # (IV)
Not offered 2001–2002.]

GERST 357 Major Works of Goethe (1749–1832) # (IV)
Fall. 4 credits. Open to all qualified students. Prerequisite: GERST 202, or 204, or 206, or equivalent, or permission of instructor. All texts are read in German, but translations will be available to serve as study aids. Class discussion in German and occasionally English. H. Deinert.
Poet, statesman, artist, scientist, rebel, conservative, mythmaker, and iconoclast, Goethe stands at the center of Germany's belated Renaissance. Taking his early cues from Homer, Shakespeare, and the Bible, he created cultural icons at once modern and steeped in tradition. We examine works from all phases of the man's incredibly productive life against the background of political turmoil in Europe and the Americas. We use art, music, and theater as additional tools of interpretation.

Courses offered in English

It may be possible to arrange a German section for courses taught in English, either informally or formally (for credit). Students are encouraged to discuss this possibility with instructors.

GERST 221 The Ethics of Imagining the Holocaust (also ENGL 221 and JWST 257) (IV)
Fall. 4 credits. D. Schwarz.
For description, see ENGL 221.

[GERST 237 The Germanic Languages (also LING 237) (III)
Not offered 2001–2002. W. Harbert, M. Diesing.]

[GERST 318 "1800" # (IV)
Not offered 2001–2002. P. Gilgen.]

[GERST 320 Postwar German Novel (IV)
Not offered 2001–2002.]

GERST 330 Political Theory and Cinema (also COM L 330, GOVT 370 and THETR 329) (III or IV)
Fall. 4 credits. G. Waite.
An introduction (without prerequisites) to fundamental problems of current political theory, filmmaking, and film analysis, along with their interrelationship. Particular emphasis on comparing and contrasting European and alternative cinema with Hollywood in terms of post-Marxist, psychoanalytic, postmodernist, and postcolonial types of interpretation. Filmmakers/theorists might include: David Cronenberg, Michael Curtiz, Kathryn Bigelow, Gilles Deleuze, Rainer Fassbinder, John Ford, Jean-Luc Godard, Marleen Gorris, Werner Herzog, Alfred Hitchcock, Allen & Albert Hughes, Stanley Kubrick, Fredric Jameson, Chris Marker, Pier-Paolo Pasolini, Gillo Pontecorvo, Robert Ray, Martin Scorsese, Ridley Scott, Oliver Stone, George Romero, Steven Shaviro, Kidlat Tahimik, Maurizio Viano, Slavoj Zizek. Although this is a lecture course, there is ample time for class discussions.

GERST 340 Metropolis: Urban Sites in Literature (IV)
Spring. 4 credits. Readings and discussions in English (texts will be available in German). A. Schwarz.
An interdisciplinary study of metropolitan life focusing on Berlin and Vienna (1890–1999) as major contexts of artistic modernity and historical change. Topics of investigation include: the city as both the product and source of artistic production; the interrelationship between literary concepts of montage, collage, and their architectural counterparts (Bauhaus et al.); the tension between private and public spaces, and the status of crowds, anonymity, and the flaneur. We also analyze the rise of an avant-garde movement in an urban environment. Focus on short fiction, architectural theory, sites and art history, film, political and literary manifestos. Authors include: Fontane, Broch, Benn, Benjamin, Döblin, Simmel, Johnson, Rilke, Kohlhaas, Vidler.

[GERST 374 Opera and Culture (also MUSIC 374) # (IV)
Not offered 2001–2002. A. Groos.]

[GERST 378 German Aesthetic Theory: From Kant to Hegel # (IV)
Not offered 2001–2002.]

[GERST 392 Minority Literature in the Federal Republic (IV)
Not offered 2001–2002. L. Adelson.]

[GERST 395 Rilke: The Duino Elegies and Sonnets to Orpheus (IV)
Not offered 2001–2002. H. Deinert.]

[GERST 396 German Film (also COM L 396 and THETR 396) (IV)
Not offered 2001–2002.]

Advanced Undergraduate and Graduate Courses

GERST 402 The Language of German Poetry (IV)
Spring. 4 credits. Taught in German. Prerequisite: GERST 301, 302, or equivalent, or permission of instructor. P. Gilgen.
Based on close readings of lyric poetry written in German from the eighteenth century to the present, this course focuses on linguistic self-reference as the fundamental trait of the poetic function of language. We also examine how poetry is defined vis-à-vis its environment by different poetic conceptions. Attentiveness to changes that affected the situation of poetry (such as new theories of language and the emergence of new media) provide historical orientation for our inquiry. To analyze in detail how poetry and poetics are affected by changing discursive structures, we read recent poetry against some of its poetic sources and address questions concerning poetic traditions, translatability, and media transpositions. Such juxtapositions may include Peter Waterhouse/Celan/Hölderlin; Oswald Egger/Brockes; Michael Donhauser/Ponge; and others.

[GERST 403 The Afro-Europeans (IV)
Not offered 2001–2002.]

[GERST 405 Introduction to Medieval German Literature I # (IV)
Not offered 2001–2002. A. Groos.]

[GERST 406 Introduction to Medieval German Literature II # (IV)
Not offered 2001–2002. A. Groos.]

GERST 407 Teaching German as a Foreign Language
Fall. 4 credits. G. Lischke.
This course has been designed to familiarize students with current ways of thinking in the field of applied linguistics and language pedagogy. It introduces different concepts of foreign language methodology as well as presents and discusses various techniques as they can be implemented in the foreign language classroom. Special consideration is given to topics such as planning syllabi, writing classroom tests, and evaluating student's performance. Participants conduct an action research project.

[GERST 408 Uncanny Communities (IV)
Not offered 2001–2002.]

GERST 409 Spinoza and New Spinozism (also COM L 442) (IV)
Spring. 4 credits. Prerequisite: permission of instructor. G. Waite.
Spinoza was excommunicated in his own time, wrote under the constant threat of death, and has remained a scandal to almost all subsequent thought, including philosophy, psychoanalysis, political theory and practice, and ethics. And he exerted a powerful, if subterranean, influence on Marx, Freud, and Nietzsche. Indeed, "every philosopher has two philosophies, his own and Spinoza's" (Henri Bergson), and "everyone is a philosopher, whether professionally or otherwise" (Antonio Gramsci). This seminar takes up the challenge of these two remarks, with two main aims: to introduce Spinoza's basic philosophical and political writings; and then to trace his legacy, concentrating on the current, international group of men and women loosely grouped as the New Spinozists. These include: Gabriel Albiac, Louis Althusser, Etienne Balibar, Gilles Deleuze and Félix Guattari, Emilia Giancotti, Luce Irigaray, Kōjin Karatani, Jacques Lacan, Pierre Macherey, and Toni Negri. Spinoza is currently being used to produce an anti-Kantian, anti-Hegelian analysis of many contemporary problems, including Cyberspace and Virtual Reality. We focus especially on the neo-communist, Althusserian tradition of reading and using Spinoza. In part this is because it may be true that "the new world system, the ultimate third stage of capitalism is for us the absent totality, Spinoza's God or Nature, the ultimate (indeed perhaps the only) referent, the true ground of Being in our time" (Fredric Jameson), though Spinoza is also interesting in his own right. In addition to selections from Spinoza's work, our basic text is the recent anthology *The New Spinoza* (ed. Warren Montag and Ted Stolze).

GERST 410 Senior Seminar
Fall. 4 credits. Open to all students with an adequate command of German. Prerequisite: any German course at the 300-level or equivalent or permission of instructor. Texts and seminar discourse in German. A. Schwarz.
Topic: The Fiction of Autobiography
An investigation of the changing forms of autobiographical discourse in novels ranging from the 18th to the 20th century. The goal of this class is to analyze the interrelationship between the constitution of subjectivity and its articulation in novels. Points of discussion include: the status of life as history; autobiography as loss or gain of selfhood; constructions of identity and literary existence. Authors include: Rilke, Frisch, Raabe, Goethe, Stifter, Th. Mann, Handke. Students are also introduced to pertinent theories of autobiography. Readings and discussion in German.

[GERST 412 German Literature from 1770 to 1848 # (IV)
Not offered 2001–2002.]

[GERST 413 Women around Freud (also COM L 412 and WOMNS 413) (IV)
Not offered 2001–2002.]

GERST 414 History into Fiction: Nazis and the Literary Imagination (also ENGL 404, COM L 404, and NES 404) (IV)
Fall. 4 credits. E. Rosenberg.
For description, see ENGL 404.

[GERST 415 Marx, Nietzsche, Freud (also COM L 425 and GOVT 473) (III or IV)
Not offered 2001–2002.]

GERST 416 Gender and the Law in German Culture (also HIST 413 and WOMNS 414) (III or IV)
Spring. 4 credits. T. Matysik.
The status of law as a social and cultural phenomenon is a much-disputed issue. This course examines the cultural space of law in modern German history. It pays particular attention to law and legal reform in relation to gendered notions of citizenry, subjectivity, and sexuality. The course takes as its hypothesis the idea that the prevalance in modern German thought of the concern with the "law" as the moral regulation of normative behavior is closely connected to the transformation of actual laws and legal codes in German history. In order to assess the terrain between such actual laws and their cultural effects, we examine a combination of literary, social-theoretical, and historiographical readings that address the problem of law. In this way we acquire, first, a general overview of German legal history together with a language with which to speak about a variety of legal theoretical traditions. Second, we explore perceptions of, responses to, and critiques of the historical role of law in German culture. Readings cover: the late eighteenth-century era of German legal reform, the late nineteenth- and early twentieth-century context in which sexual morality had re-entered the legal domain and, more recent thought on law. At the same time, we use our historical understanding to assess the extent to which these more recent critical efforts are a departure from and/or a continuation of their historical predecessors. In the course of these investigations we are guided by questions of the relationships between law, subjectivity, gender, citizenship, and morality.

GERST 417 Faust: Transformations of a Myth (also COM L 417) # (IV)
Spring. 4 credits. Taught in English. H. Deinert.
Few legends have so engaged the imagination as that of the man who signed a pact with the devil to obtain pleasure, power, and knowledge. While the myth itself is timeless, the modern version takes its cue from one real Georg Faust, a figure of dubious character, half scholar, half quack, during the time of the German Reformation. The German *Volksbuch* depicting his adventures was almost immediately translated into English and became the inspiration for Marlowe's *Tragical History of Doktor Faust*. Goethe devoted some 60 years to his *Faust*, completing it only months before his death in 1832. While Marlowe's Faust deserves eternal damnation for his hubris, Goethe's protagonist finds favor with God for the same reason. We look at various representations of the myth from the late sixteenth century through the early nineteenth. The *Faust Book*, Marlowe, and Goethe are our main texts. We listen to some of the music they have inspired: Schubert, Schumann, Berlioz, Gounod, Mahler; and look at related mythical figures like Lucifer, Prometheus, Don Juan, Ahasverus, Schlemiehl, and others. Time permitting, we discuss selections from several recent versions: Bulkagov's *The Master and Margarita* (1938), Valéry's *Mon Faust* (1940), and Thomas Mann's *Doktor Faustus* (1947).

[GERST 418 Thomas Mann (IV)
Not offered 2001–2002.]

GERST 419 Modern Nomads (also S HUM 419) (IV)
Spring. 4 credits. Limited to 15 students. J. Noyes.
For description, see S HUM 419.

GERST 420 Jewish Culture and Modernity (also S HUM 408) (IV)
Fall. 4 credits. M. Steinberg.
For complete course description see S HUM 408.

[GERST 428 Genius and Madness in German Literature (also COM L 409) (IV)
Not offered 2001–2002.]

[GERST 430 Brecht, Artaud, Müller, Wilson (also COM L 430 and THETR 420) (IV)
Not offered 2001–2002. D. Bathrick.]

[GERST 435 Introduction to Literary Theory (also COM L 435) (IV)
Not offered 2001–2002.]

GERST 441 Introduction to Germanic Linguistics (also LING 441) (III)
Fall. 4 credits. W. Harbert.
For course description see LING 441.

[GERST 447 Reading Freud: Gender, Race, and Psychoanalysis (also COM L 447 and WOMNS 447) (IV)
Not offered 2001–2002.]

[GERST 449 Rescreening the Holocaust (also COM L 453 and THETR 450) (IV)
Not offered 2001–2002. D. Bathrick.]

GERST 451–452 Independent Study
451, fall; 452, spring. 1–4 credits each term. Prerequisite: permission of instructor.

GERST 453 Honors Research
Fall. 4 credits. Staff.

GERST 454 Honors Thesis
Spring. 4 credits. Staff.

GERST 457/657 Imagining the Holocaust (also COM L 483/683, ENGL 458/658, and JWST 458/658) (IV)
Spring. 4 credits. D. Schwarz.
For description, see ENGL 458/658.

[GERST 472 Poetry of the 1990s (also COM L 472) (IV)
Not offered 2001–2002.]

[GERST 492 The Advance of Humanism: Aspects of the European Enlightenment # (IV)
Not offered 2001–2002.]

[GERST 495 The Cultural Theory of the Frankfurt School (also COM L 495, GOVT 471) (III or IV)
Not offered 2001–2002. P. U. Hohendahl.]

GERST 496 Theorizing the Public Sphere (also COM L 496 and GOVT 464) (III or IV)
Fall. 4 credits. P. U. Hohendahl.
The recent translation of Jürgen Habermas's *The Structural Transformation of the Public Sphere* into English has renewed the debate about the nature and significance of the public and publicity, about public communication and the media. This discussion has centered around the history of the public sphere in modern society and its relevance for contemporary culture and politics. The seminar discussion deals with contemporary as well as historical topics, among them the significance of class, gender, and race for the construction of the public sphere, the possibility of shared cultures in advanced industrial societies, and the character of public communication under the conditions of the new media. The readings focus on three seminal texts, namely Hannah Arendt's *The Human Condition* (1958), Jürgen Habermas's *The Structural Transformation of the Public Sphere* (1962), and Oskar Negt's/Alexander Kluge's *Public Sphere and Experience*. The discussion includes readings from Richard Sennett and Reinhart Koselleck. Special attention is given to the recent debate about the history and function of the public sphere, which was collected in Craig Calhoun's volume *Habermas and the Public Sphere* (1992) with contributions (among others) by Thomas McCarthy, Nancy Fraser, Mary P. Ryan, Geoff Eley, and Jürgen Habermas.

[GERST 498 German Literature in Exile (IV)
Not offered 2001–2002.]

Graduate Courses

Note: For complete descriptions of courses numbered 600 or above consult the appropriate instructor.

[GERST 600 Special Topics in Feminist Theory (also ANTHR 600 and COM L 600)
Not offered 2001–2002.]

[GERST 606 Topics in Historical Germanic Phonology
Not offered 2001–2002. W. Harbert.]

[GERST 607 Topics in Historical Germanic Morphology
Not offered 2001–2002.]

[GERST 608 Topics in Historical Germanic Syntax
Not offered 2001–2002. W. Harbert.]

[GERST 614 Gender at the Fin-de-siècle
Not offered 2001–2002.]

[GERST 615 Jews in German Culture Since 1945 (also JWST 615)
Not offered 2001–2002.]

[GERST 617 Literature and Affect (also COM L 625)
Not offered 2001–2002. A. Schwarz.]

[GERST 618 "The Science of the Experience of Consciousness": Hegel's *Phenomenology of Spirit* (and Beyond)
Not offered 2001–2002. P. Gilgen.]

[GERST 621 Issues in Gay and Lesbian Studies (also WOMNS 621)
Not offered 2001–2002.]

[GERST 624 Seminar in Medieval German Literature II
Not offered 2001–2002.]

[GERST 626 Nuremberg
Not offered 2001–2002.]

[GERST 627 Baroque (also COM L 626)
Not offered 2001–2002.]

[GERST 629 The Enlightenment
Not offered 2001–2002. P. U. Hohendahl.]

[GERST 630 Classicism and Idealism
Not offered 2001–2002.]

GERST 631–632 Academic German I and II
631, fall; 632, spring. 3 credits each term. Limited to graduate students. Prerequisite: for GERST 632, GERST 631 or equivalent. Staff.
Intended primarily for beginners with little or no previous German knowledge. Emphasis in 631 on acquiring basic German reading skills. Emphasis in 632 on development of the specialized vocabulary of student's field of study.

GERST 634 German Romanticism
Fall. 4 credits. Most readings in German; discussion and papers in English. Students from other disciplines welcome. Anchor course. G. Waite.
Structured introduction to German literature, cultural criticism, political thought, and philosophy from c. 1789 to c. 1830 in two basic contexts: revolutionary Europe at the time and subsequent theory. The latter includes Marxists (on "the German ideology"), Freudians (on "the uncanny"), Heidegger (on "the other beginning" in Hölderlin), de Man (on "the rhetoric of romanticism"), Lacoue-Labarthe & Nancy (on Early Romantic criticism and "the literary absolute"), and Deleuze & Guattari (on "the war machine" in Kleist). Authors/topics might include: B. and A. von Arnim, Arndt, Brentano, Fichte, Gontard, the Grimm brothers, Günderode, Hegel, Heine, Hölderlin, Hoffmann, Kleist, Novalis, Schelling, C. Schlegel-Schelling, F. Schlegel, Schleiermacher, Tieck, Varnhagen, D. Veit-Schlegel, and the repercussions of the Spinoza debate (since Lessing and Jacobi). Primary methodological focus is on the close reading of short, symptomatic texts.

GERST 635 The Gates to Modernity: From Karlsbad to the 1848 Revolution
Spring. 4 credits. Anchor course. P. U. Hohendahl.
The seminar focuses on Germany's entry into the modern age represented by authors such as Heine, Büchner, Feuerbach, and Marx. The course deals with the cultural, political, and social consequences of the Enlightenment, among them the democratization of literature and culture, the politicization of philosophy, and the emancipation of underprivileged groups (women and the working class). Readings trace the formation of bourgeois culture and its contradictions as they are articulated by the writers of Young Germany, the Left Hegelians, and radical literati of the 1840s. In addition to the authors mentioned above, readings are taken from the works of Bettina von Arnim, Börne, Grabbe, Hebbel, and Fanny Lewald.

[GERST 637 Nineteenth-Century Fiction: The Realist Project
Not offered 2001–2002.]

GERST 640 The Modern German Novel
Fall. 4 credits. A. Schwarz. .
The goal of this seminar is to analyze selected works of modernist fiction in order to assess the stylistic qualities that constitute their specifically modernist character. Concentrating on novels ranging from the late 19th to the early 20th century, we pay close attention to questions of narrative structure as well as temporal and spatial arrangements. Also including comparatist interests, the seminar discusses the modern German novel within the European context; discusses generic differences (modern versus "classic"); and examines theories of the novel and their relationship to contemporary representational concerns. Specific points of interest are: the status of self-reflection; philosophical interruptions; irony; montage; subjectivity and literary self-projection; and literature and urbanity. In order to evaluate the "very" modern, the class also discusses two examples of contemporary fiction. Authors include: Rilke, Kafka, Döblin, Broch, Th. Mann, R. Walser, Nossack, Handke, Johnson, Bernhard, Goetz. All texts are read in translation. (German speakers are encouraged to read the original texts).

GERST 641 The Gay Critic (also COM L 661)
Fall. 4 credits. Reading knowledge of German is recommended but not required for this course. P. Rehberg.
This seminar examines the problematic relationship between discourses of homosexuality and criticism in the modern German tradition, where "the homosexual" has figured as both object and subject of social, cultural, and political criticism. The course first reviews the discursive invention of "the homosexual" in medical and juridical practices of the late nineteenth century and subsequently explores the epistemological and discursive status of this figure in psychoanalysis, fascism, Critical Theory, and in novels and films of the Federal Republic. Taking familiar theorems about homosexuality and modernity as a point of departure, this seminar investigates specifically German contributions to theories and representations of twentieth-century homosexuality in its historical and rhetorical contours. Readings includes stylistically diverse works by M. Foucault, S. Freud, K. Mann, K. Theweleit, L. Riefenstahl, T. W. Adorno, A. Hewitt, H. Fichte, and R. W. Fassbinder.

[GERST 647 German Literature from 1949 to 1989: Questions about Identity
Not offered 2001–2002. L. Adelson.]

[GERST 650 Culture in the Weimar Period
Not offered 2001–2002. D. Bathrick.]

GERST 652 Culture in Germany 1933–1945
Spring. 4 credits. Prerequisite: reading knowledge of German necessary; permission of instructor. Anchor course. D. Bathrick.
This course examines three contexts for culture in Germany during the Nazi period. First, the officially promoted party literature and mass mediated culture (film, music, architecture, the performing and visual arts) produced within the *Third Reich*. Second, the

various cultures of resistance, "Inner Immigration," or non-compliance as they emerged in the realm of literature and mass culture during the period. Third, the culture of the Jewish community of Germany and Austria during the Nazi period as well as the cultural products of the concentration and death camps.

[GERST 653 Opera (also COM L 655 and MUSIC 679)
Not offered 2001–2002.]

GERST 656 Aesthetic Theory: The End of Art (also COM L 656, ART H 447 and Visual Studies)
Fall. 4 credits. Prerequisite: permission of instructor. P. Gilgen.
This course investigates the emergence of aesthetics as its own discipline at the end of the eighteenth century. We examine the rationalist articulation of aesthetics in Baumgarten's work and the empiricist theory of taste, particularly Burke's *Enquiry*. Drawing on the findings of these two traditions, Kant's *Critique of Judgment* (1790) inaugurated a preoccupation in German philosophy around 1800 with the philosophical status of the beautiful and of art. Especially in Romantic theory and practice, art was meant to provide a solution to the philosophical dilemmas in the wake of Kant's critical philosophy. But already in Hegel's *Phenomenology*, and more explicitly in the *Encyclopedia* and the *Lectures on Aesthetics*, art lost this elevated position vis-à-vis philosophy. Taking this observation as a guiding thread, the main part of the course is structured around in-depth readings that may include Kant, Schiller, Schelling, Schlegel, Novalis, Hölderlin, and Hegel. Further readings may include writings by contemporary philosophers and theoreticians such as Derrida, Lyotard, de Man, Adorno, and Danto. The following questions will be addressed: What are the conditions for the move from the subjective judgment of taste (Kant) to objective beauty (Romantics, Hegel)? How is the relation of art and nature reconceived by the Romantics? What is the relation of aesthetic theory and the history of art? Is philosophy the end of art?

[GERST 658 Old High German/Old Saxon (also LING 646)
Not offered 2001–2002. W. Harbert.]

[GERST 660 Visual Ideology (also COM L 660 and THETR 660)
Not offered 2001–2002. G. Waite.]

[GERST 661 After the City: From Metropolis to Electropolis (also ARCH 338/638 and COM L 661)
Not offered 2001–2002.]

[GERST 663 Nietzsche and Heidegger (also COM L 663)
Not offered 2001–2002. G. Waite.]

[GERST 664 Freud and the *Fin de siècle*
Not offered 2001–2002.]

[GERST 666 Ingeborg Bachmann
Not offered 2001–2002.]

[GERST 667 "Minor" German Literatures?
Not offered 2001–2002.]

[GERST 668 Literature and the Uncanny (also COM L 664)
Not offered 2001–2002.]

[GERST 669–670 Modern Social Theory I & II (also GOVT 669–670)
Not offered 2001–2002. S. Buck-Morss.]

GERST 671 Postcolonial Theory and German Studies (also COM L 688)
Spring. 4 credits. Prerequisite: graduate standing or permission of instructor. L. Adelson.
The recent boom in interdisciplinary scholarship at the crossroads of German Studies and postcolonial theory challenges conventional parameters of both fields of inquiry. The mutual interrogation of German Studies and postcolonial theory promises to reconfigure our understanding of colonial histories in relation to social imaginaries (including facets of: German fascism, German intellectual history, modernist canons, 20th-century nationalism, and European relations on the continent and in the world). With these broad analytical concerns in mind this course juxtaposes readings in the histories and literary cultures surrounding German colonialism with readings in international postcolonial theory as well as new postcolonial scholarship on explicitly German objects of study. Some by now canonical works by postcolonial theorists (*e.g.*, Fanon, Said, Bhabha, Spivak, Pratt) are used both to introduce key concepts and dilemmas and to excavate decisive German influences on postcolonial theory outside putatively German contexts. Scholarly innovations by authors such as S. Zantop, R. Berman, N. Berman, J. Noyes, L. Wildenthal, P. Grosse, M. Klotz, and others are highlighted, while literary examples (*e.g.*, G. Frenssen, F. v. Bülow, F. Kafka, I. Bachmann, H. Müller, H. M. Enzensberger, B. Honigmann, H. Cixous, and others) are drawn primarily from the nineteenth and twentieth centuries. Reading knowledge of German is not required.

[GERST 672 German Opera Topic: Wagner (also MUSIC 674)
Not offered 2001–2002.]

[GERST 674 Contemporary Poetry and Culture: 1968–1993 (also COM L 674, ENGL 697, and SPAN L 674)
Not offered 2001–2002.]

[GERST 675 After the Divide: German Critical Theory of the Seventies and Eighties (also COM L 675 and HIST 675)
Not offered 2001–2002. P. U. Hohendahl.]

[GERST 679 Bertolt Brecht in Context (also COM L 679 and THETR 679)
Not offered 2001–2002.]

GERST 685 Gramsci and Cultural Politics (also COM L 685 and GOVT 675)
Spring. 4 credits. G. Waite.
The modern or postmodern, and increasingly global, capitalist system rules not only by overt violence and coercion but also in tandem with what Antonio Gramsci (1891-1937) called the "non-coercive coercion" of "cultural hegemony." This seminar has two basic aims: (1) to introduce the basic political, theoretical, historical, and cultural writings of Gramsci himself (which also requires attention to his main sources, e.g., Croce, Dante, Lenin, Marx, Machiavelli); and then (2) to trace main directions of the Gramsci legacy in philosophy, political theory and practice, and cultural theory and practice (notably filmmaking). This legacy includes the works of Aijaz Ahmad, Louis Althusser, Christine Buci-Glucksmann, Norberto Bobbio, Ernesto Laclau, Ariel Dorfman & Armand Mattelart, Chantal Mouffe, and Pier-Paolo Pasolini, among others. It also includes less famous, but no less important, individuals and groups: e.g., feminist activists in Italy, the subaltern study movement in India, and other forms of anti-capitalist theory and practice around the world. We must also note that the first English translation of The Prison Notebooks was made by the U.S. Pentagon, and that "the ashes of Gramsci" is a code name in Italy for cocaine. Our main texts are Gramsci's Pre-Prison Writings and his Prison Notebooks and Letters, which we read alongside symptomatic examples of his ongoing legacy.

[GERST 686 Althusser and Lacan (also COM L 686, GOVT 679, and FRLIT 623)
Not offered 2001–2002.]

[GERST 687 The Politics of Culture in the German Democratic Republic
Not offered 2001–2002.]

[GERST 689 Art and Truth: The Aesthetic Theory of Theodor W. Adorno (also COM L 689)
Not offered 2001–2002.]

[GERST 690 Feminist Criticism and Theory (also WOMNS 690)
Not offered 2001–2002.]

[GERST 693 "The Sign of History": Kant and Lyotard (also COM L 693, GOVT 761)
Not offered 2001–2002. P. Gilgen.]

[GERST 699 German Film Theory (also COM L 699 and THETR 699)
Not offered 2001–2002.]

GERST 753–754 Tutorial in German Literature
Fall and spring. 1–4 credits per term. Prerequisite: permission of instructor.

Dutch

DUTCH 121–122 Elementary Dutch
121, fall; 122, spring. 4 credits each term. *Provides language qualification.* Prerequisite: permission of instructor. M. Briggs.
Intensive practice in listening, speaking, reading, and writing basic Dutch in meaningful contexts. The course also offers insight into Dutch language, culture, and society.

DUTCH 203 Intermediate Composition and Conversation
Fall. 3 credits. Prerequisite: qualification in Dutch or permission of instructor. *Provides language proficiency.* M. Briggs.
Improved control of Dutch grammatical structures and vocabulary through guided conversation, compositions and reading, drawing on all Dutch-speaking cultures. Taught in Dutch.

DUTCH 204 Intermediate Composition and Conversation
Spring. 3 credits. Prerequisite: DUTCH 203 or permission of instructor. M. Briggs.
This course emphasizes written and oral application of accurate, idiomatic Dutch. Reading of authentic material such as newspapers, literature, and history, with emphasis on the students' interests and specializations. Taught in Dutch.

DUTCH 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: proficiency in Dutch or permission of instructor. M. Briggs.
Individualized advanced Dutch studies. This course provides students with individualized

programs which can be anything from advanced mastery in any or all skills to the mastery of Dutch for research. Literature history in support of all disciplines. Taught in Dutch. Topic for fall: Afrikaans.

Swedish

SWED 121–122 Elementary Swedish
121, fall; 122, spring. 4 credits each term. Prerequisite: for SWED 122, SWED 121 or equivalent. L. Trancik.
The course develops skills in listening, speaking, reading, and writing within Sweden's cultural context. Work on the Internet and interactive computer programs are used in these courses.

SWED 123 Continuing Swedish
Fall. 4 credits. *Provides language qualification.* Prerequisite: SWED 122 or equivalent. L. Trancik.
Development of skills in spoken and written Swedish within Sweden's cultural context.

SWED 203 Intermediate Swedish
Fall. 3 credits. *Provides language proficiency.* Prerequisite: SWED 123 or permission of instructor. L. Trancik.
Intermediate to advanced-level instruction using audio-visual material and text to enhance language comprehension.

SWED 204 Advanced Swedish
Spring. 3 credits. Prerequisite: SWED 203 or permission of instructor. Taught in Swedish. L. Trancik.
Emphasis on improving oral and written expression of Swedish, including vocabulary, readings in contemporary prose, treatment of specific problems in grammar, and presentation of videos and films.

SWED 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. L. Trancik.
Taught on a specialized basis to address particular student needs. Times will be arranged with instructor.

GOVERNMENT

I. Kramnick, chair; R. Bensel, S. Buck-Morss, V. Bunce, A. Carlson, J. Cowden, M. Evangelista, R. Herring, N. Hirschmann, M. Jones-Correa, M. Katzenstein, P. Katzenstein, E. W. Kelley, J. Kirshner, T. J. Lowi, R. McDermott, W. Mebane, K. O'Neill, J. Pontusson, J. Rabkin, L. Ryter, E. Sanders, H. Schamis, M. Shefter, V. Shue, A. M. Smith, J. J. Suh, S. G. Tarrow, N. T. Uphoff, C. Way

Government is what Cornell calls a department that elsewhere might be termed political science. The focus of this discipline is power applied to public purposes. Some faculty concentrate on purposes, some on applications. Some engage in the close reading of great texts of political philosophy, while others analyze the behavior of power-wielders and publics in this and other societies. Government is divided into four subfields: U. S. politics, comparative politics (other nations), political theory (philosophy), and international relations (transactions between nations).

To accommodate new courses or course changes, a supplementary announcement is prepared by the department. Before enrolling in courses or registering each term, students are requested to consult the current supplement listing courses in government, available in 125 McGraw Hall.

The Major

To be admitted to the major, a student must pass two government courses.

To complete the major, a student must:

(1) pass two of the introductory government courses (GOVT 111, 131, 161, 181);

(2) pass an additional course in one of the remaining subfields (American government, comparative government, political theory, or international relations). This course may be any course offered in the government department, including introductory courses, upper-level courses or seminars. Students are strongly advised to take at least one course in each of the four subfields;

(3) accumulate an additional 28 credits of government course work at the 200-level or above;

(4) complete at least one seminar-style course in government which may be applied toward the 28 credits. These courses include those numbered 400.XX to which students are admitted by application only;

(5) accumulate 12 credits in upper-level courses in related fields (such as anthropology, economics, history, science and technology studies, psychology, and sociology). Upper-level courses are usually courses numbered at the 300 level or above (200-level courses are not considered upper-level). Students should consult with their major adviser to choose appropriate courses. All choices of related courses must be approved by the major adviser or the director of undergraduate studies;

(6) all courses used to fulfill a government major must be passed with a letter grade.

To summarize, a total of 10 government courses and three additional courses (12 credits) of upper-level related courses are required to complete the major.

Cornell-in-Washington Program. Government majors may apply to the Cornell-in-Washington program to take courses and undertake a closely supervised externship during a fall or spring semester.

European Studies Concentration. Government majors may elect to group some of their required and optional courses in the area of European studies, drawing from a wide variety of courses in relevant departments. Students are invited to consult Professors P. Katzenstein, J. Pontusson, and S. G. Tarrow for advice on course selection and foreign study programs.

Model European Community Simulation. Undergraduates with an interest in the European Union, public affairs, or debating may participate in an annual European Union simulation held, on an alternating basis, in April at SUNY Brockport or in January in Brussels. The simulation provides an opportunity for participants, representing politicians from the members states, to discuss issues and resolutions of current concern to the European Union.

To prepare for the simulation, a two-credit course is offered by the Government department each year (GOVT 431 or GOVT 432). Participation in the simulation is open only to those who register for this course. Anyone interested in participating or finding out more information should contact the Institute for European Studies at 120 Uris Hall, 255–7592.

International Relations Concentration. See the description under "Special Programs and Interdisciplinary Studies."

Honors. In their junior year, Government majors with a G.P.A. of 3.3 in all subjects may join the honors program, which involves a sequence of special courses in the junior and senior year. Application to the honors program is made in the late spring of the sophomore year and application forms are available in 125 McGraw Hall. The courses comprising the honors sequence (honors courses) are described below. Students may be admitted to the honors program in the junior or senior year only with the special permission of the Director of Undergraduate Studies.

Introductory Courses

Students registering for introductory courses should register for the lecture only. Sections are assigned during the first week of class. Introductory courses are also offered during summer session.

GOVT 111 Introduction to American Government and Politics (III)
Fall and summer. 3 credits. T. J. Lowi.
An introduction to government through the American experience. Concentration on analysis of the institutions of government and politics as mechanisms of social control.

GOVT 131 Introduction to Comparative Government and Politics (III)
Spring and summer. 3 credits.
J. Pontusson.
This course provides a survey of the institutions, political processes, and policies of contemporary states. It focuses on the conditions for and workings of democracy. Looking at Western Europe, we analyze institutional variations among liberal democracies, and their political implications. We then probe the origins of democracy in Western societies and the reasons why communism and other forms of authoritarian rule have prevailed elsewhere. Finally, we explore the impetus behind and the obstacles to democratization in the Third World and the erstwhile Communist Bloc. Throughout this survey, problems of democracy are related to problems of economic development, efficiency, and equality.

GOVT 161 Introduction to Political Philosophy # (III)
Spring. 3 credits. I. Kramnick.
A survey of the development of Western political theory from Plato to the present. Readings from the works of the major theorists. An examination of the relevance of their ideas to contemporary politics.

GOVT 181 Introduction to International Relations (III)
Fall and summer. 3 credits. J. Kirshner.
An introduction to the basic concepts and practice of international politics.

First-Year Writing Seminars

Consult the John S. Knight Institute brochure for times, instructors, and descriptions.

Major Seminars

GOVT 400 Major Seminars
Fall or spring. 4 credits.
These seminars, emphasizing important controversies in the discipline, cap the majors' experience. Thus preference in admission is given to majors over nonmajors and seniors over juniors. Topics and instructors change each semester. To apply, students should pick up an application in 125 McGraw Hall during the course selection period the semester before the seminar is given.

The following courses are open to sophomores, juniors, and seniors without prerequisites unless otherwise indicated.

American Government and Institutions

GOVT 111 is recommended.

GOVT 302 Social Movements in American Politics (also AM ST 302) (III)
Fall. 4 credits. E. Sanders.
From populism to environmentalism, social movements directed at reform of national policies and political structures have been an earmark of American politics. This course begins with an examination of late nineteenth-century agrarian and labor movements and moves through progressivism, a variety of 1930s upsurges, civil rights, and more or less contemporary environmental, consumer, feminist, peace, gay rights, and new religious right movements. The focus is on the conditions that gave rise to these movements, their internal resources, and external alliances and their ultimate impact on the national state (as well as vice versa).

[GOVT 303 Introduction to American Political Parties (III)
4 credits. Not offered 2001–2002.]

GOVT 304 Public Opinion and Political Participation (III)
Spring. 4 credits. J. Cowden.
GOVT 304 is a survey course about the nature and impact of public opinion and mass political behavior. We examine classic and contemporary scholarship on the following topics: the role of public opinion in democratic theory; the measurement of opinions; the political sophistication of the electorate; racial and political intolerance; political socialization; party identification and party systems; media effects; candidate preference; turnout and abstention; attitudes about distributive justice; and the intersection between public opinion and public policy.

[GOVT 305 Atomic Consequences: The Incorporation of Nuclear Weapons in Post-War America (III)
4 credits. Not offered 2001–2002.]

GOVT 308 Science in the American Polity 1800–1960 (also S&TS 390) (III)
Fall. 3 credits. M. Dennis.
See S&TS 390 for description.

GOVT 309 Science in the American Polity (also S&TS 391) (III)
Fall. 4 credits. M. Dennis.
This course reviews the changing political relations between science, technology and the state in America from 1960 to the present. It focuses on the politics of choices involving science and technology in a variety of institutional settings, from Congress to courts and regulatory agencies. The tensions and contradictions between the concepts of science as an autonomous republic and as just another special interest provide the central theme for the course. Topics addressed include research funding, technological controversies, scientific advice, citizen participation in science policy, and the use of experts in courts.

GOVT 310 Power and Poverty in America (III)
Fall. 4 credits. E. W. Kelley.
Despite egalitarian democratic rights, the United States remains a stratified society conspicuous for great disparities in the allocation of income and wealth. The purpose of this class is to investigate these disparities, both empirically and normatively, and to assess the impact of government on them. Topics for discussion include: What do we mean by distributional inequality and by the demand for greater egalitarianism? What is the extent of inequality and of poverty in America today? How does one establish minimum standards for distributional justice? Is the United States currently on the road toward achieving that minimum standard? What is the array of federal welfare programs presently available and what is their effect? What reforms or changes are currently on the political agenda? Can we imagine a society somewhat like that in the United States achieving a very different distribution of educational and occupational outcomes as described by race, income, class, and language spoken by parents?

GOVT 311 Urban Politics (III)
Fall. 4 credits. M. Shefter.
Covers the major political actors, institutions, and political styles in large American cities: mayors, city councils, bureaucracies, ethnic and racial minorities, urban machine politics, and the municipal reform movement. Considers the implications of these political forces for policies pertaining to urban poverty, homelessness, and criminal justice.

GOVT 313 The Nature, Functions, and Limits of Law (III)
Spring. 4 credits. Undergraduates only. R. Hillman.
A general education course for students at the sophomore and higher levels. Law is presented not as a body of rules but as a set of varied techniques for resolving conflicts and dealing with social problems. The roles of courts, legislatures, and administrative agencies in the legal process is analyzed, considering also the constitutional limits on their power and practical limits of their effectiveness. Assigned readings consist mainly of judicial and administrative decisions, statutes and rules, and commentaries on the legal process. Students are expected to read assigned materials before each class and to be prepared for participation in class discussion.

[GOVT 314 Prisons (III)
4 credits. Not offered 2001–2002.]

[GOVT 316 The American Presidency (also AM ST 316) (III)
4 credits. Not offered 2001–2002.]

GOVT 317 Campaigns and Elections (III)
Fall. 4 credits. W. Mebane.
This course examines campaigns and elections, focusing primarily on national elections in the United States. Topics include the relationship between elections and the economy, the weakness of the American party system, voter turnout, individual voting decisions, negative campaigning, and the noncompetitiveness of congressional elections. We examine several theories that explain these phenomena, including in particular the theory of rational choice. Course requirements include one or two papers based on original analysis of election survey data.

GOVT 318 The American Congress (III)
Spring. 4 credits. M. Shefter.
The role of Congress in the American political system. Topics discussed: the political setting within which Congress operates, the structure of Congress, the salient features of the legislative process, and recent congressional behavior in a number of policy areas.

GOVT 319 Minority Politics in the US (also LSP 319) (III)
Spring. 4 credits. M. Jones-Correa.
In 1965 the landscape of American politics changed dramatically with the passage of the Voting Rights Act. That same year, Congress passed the Immigration Reform Act, which though little heralded at the time, arguably has had equally profound effects. This course provides a general survey of minority politics in the United States, focusing on the effects of these two key pieces of legislation. The course highlights the relationships between immigrants and minorities, electoral politics and protest politics, and between cooperation and competition within and among minority groups. The purpose of the course is not only to pinpoint the similarities and differences in the agendas and strategies adopted by minority groups, but to indicate the interaction between "minority" politics and American politics as a whole.

GOVT 320 Public Opinion and Public Choice (III)
4 credits. Prerequisite: GOVT 111 or permission of the instructor. W. Mebane.
A fundamental paradox in democracy is the fact that a government the people control will only rarely be a government that does what the people want. This is not to say that government **not** by the people is better (it's usually worse). This course explores this problem, contrasting the answers given by the concept of public opinion and the formal theory of social choice. We encounter the paradox in several American political institutions, including elections, legislatures, and bureaucracy.

GOVT 324 Legal Reasoning and Legal Adaptation: A Comparison of American and Talmudic Law (III)
Spring. 4 credits. J. Rabkin.
Legislatures may change old laws to reflect new preferences, but much American law is still adapted to modern challenges by judges using old precedents and principles, particularly in fields like family law, the law of contracts, and the law of torts. Talmudic law, which rests on much older principles and precepts and cannot fall back on new legislation to justify change in the modern

world, must also be adapted to new circumstances. The rabbinic authorities who seek to apply this law often invoke similar kinds of reasoning as American courts but under peculiar constraints. This course, an unusual venture in comparative law, focuses on characteristic modes of reasoning in each system, rather than attempting any systematic surveys of legal outcomes. Readings include selections from ancient texts as well as modern decisions and contemporary commentaries. No previous background is required.

[GOVT 327 Civil Liberties in the United States (III)
4 credits. Not offered 2001–2002.]

GOVT 328 Constitutional Politics: The United States Supreme Court (III)
Fall. 4 credits. J. Rabkin.
The course investigates the role of the Supreme Court in American politics and government. It traces the historical development of constitutional doctrine and the institutional role the court has played in American politics.

[GOVT 353 Feminism Movements and the State (also WOMNS 353) (III)
4 credits. Not offered 2001–2002.]

GOVT 404 American Political Development in the 20th Century (co-taught with GOVT 612) (III)
Spring. 4 credits. E. Sanders.
This course focuses on the major outbursts of reform directed at the national state from around 1890 to 2001: populism, progressivism, the New Deal, the civil rights—antiwar—environmental—feminist era 1964–76, and the emergence of new conservative movements in the 1980s and after, as well as the challenges to the neo-conservative and religious right movements posed by anti-nuclear weapons and gay rights movements. In each period we attempt to specify the composition and grievances of the reformers, changes in political party regimes, and their legislative and other institutional and cultural legacies. We identify grand and continuing themes in these episodic reform movements and what they say about American political life and institutions past and present.

GOVT 406 Politics of Education (III)
Fall. 4 credits. E. W. Kelley.
Education is simultaneously America's biggest business and the institutional process through which skills and values are passed on to the next generation. This course deals with conflicts about, and the politics of, education as they occur at national, state, and local levels. What (including values) will be taught and to whom? Who will benefit from formal education as a vehicle for entry into economic opportunity? What are the powers and restrictions on government in this area? How does the American system differ from other systems? How does educational testing affect equal opportunity to obtain meaningful competencies and jobs?

GOVT 408 Politics of the American Civil War (also AM ST 430) # (III)
Spring. 4 credits. R. Bensel.
The Civil War, along with the Founding of the nation in the late eighteenth century, is one of the two most important influences on the course of American political development. Arising out of intense ideological, cultural, and economic competition between the slave South and the free labor North, the conflict created two new national states: a northern Union that replaced the loose federation of the antebellum period and a southern Confederacy that perished at Appomattox. In this course, particular attention is paid to: the political economy and culture of plantation slavery in the antebellum South; the apparent inevitability of collision between the slave and free states and their respective societies; the military, political, and economic strategies that determined, on both sides, the course and duration of the war; the limits and possibilities of reform of southern society during Reconstruction; and the impact of the Civil War on the subsequent development of the United States.

GOVT 409 Racial Prejudice and Political Intolerance (III)
Fall. 4 credits. J. Cowden.
This course explores the nature, scope, and etiology of intolerance and its implications for the operation of politics in the United States. Readings include many of the classics in political science, political psychology, psychoanalysis, and social psychology, dating from the 1930s to the present.

[GOVT 412 American Political Parties and Elections (III)
4 credits. Not offered 2001–2002.]

[GOVT 413/613 Finance, Federalism, and Politics (III)
4 credits. Not offered 2001–2002.]

GOVT 416 Personality and Politics (III)
Fall. 4 credits. J. Cowden.
The guiding assumption of this course is that politics is influenced in fundamental ways by variables that are commonly summarized by the term "personality." The course examines in a systematic fashion the effects of such variables on leadership, culture and ideology, national character, ethnic violence and hostility, and mass movements.

GOVT 419 The Politics of Scandal (III)
Spring. 4 credits. M. Shefter, J. Rabkin.
This seminar discusses the politics of "scandal" and "reform" in constitutional doctrine, American history, and recent experience.

[GOVT 427 The Politics of Environmental Protection in America (III)
4 credits. Not offered 2001–2002.]

GOVT 428/728 Government and Public Policy: An Introduction to Analysis and Criticism (III)
Fall. 4 credits. T. J. Lowi.
GOVT 428 concentrates on history and criticism of U.S. policies and the politics associated with them. Particular attention is given to the origins and character of the regulatory state and the welfare state.

GOVT 429 Government and Public Policy: An Introduction to Analysis and Criticism (III)
Spring. Open to undergraduates. 428 and consent of instructor are required for 429.
T. J. Lowi.
GOVT 429 is an opportunity to pursue further the research begun in 428.

Comparative Government

GOVT 131 is recommended.

GOVT 326 Building a Better Democracy (III)
Fall. 4 credits. K. O'Neill.
How would you put together a constitution for a newly democratic country? Democracy exhibits a variety of forms throughout the world. While all of these forms are democratic, the different structures and rules adopted by countries can lead to surprisingly different outcomes. This course explores the tradeoffs inherent in choosing a presidential versus a parliamentary structure. We will look at the consequence of using different electoral rules, whether there is a meaningful difference between systems with two parties and those with multiple parties, and what the different arguments are for choosing a unitary versus a federal government structure. The course combines theoretical arguments about different democratic institutions with real world examples of constitutional assemblies and constitutional reforms from Africa, Latin America, Israel, the United States, and Western and Eastern Europe.

GOVT 330 Europe, the US, and Japan in the Global Economy (also ILRIC 333) (III)
Fall. 4 credits. L. Turner.
For a description, see ILRIC 333.

GOVT 332 Modern European Politics (III)
Fall. 4 credits. D. Schirmer.
The course gives an introduction to politics and political systems in Western Europe. It starts with a brief history of the formation of the nation state and the establishment of democratic rule. It continues with the modes and structures of political conflict and explores political cultures, party and electoral systems, the roles of interest groups and social movements, and the mass media. It then turns to a discussion of parliament and government. The main countries studied include Britain, France, Germany, and Italy. The main dimensions guiding the comparison are conflict vs. consent, federalism vs. centralism, parliamentary vs. presidential systems, and majority vs. proportional representation. The course concludes with a discussion of minority-majority relations and the problem of democratic inclusion.

[GOVT 333 Government and Politics of the Former Soviet Union (III)
4 credits. Not offered 2001–2002.]

[GOVT 334 Political Economy of East Asia @ (III)
4 credits. Not offered 2001–2002.]

[GOVT 335 America in the World # (III)
4 credits. Not offered 2001–2002.]

[GOVT 336 Postcommunist Transitions (III)
4 credits. Not offered 2001–2002.]

[GOVT 338 Comparative Political Economy (III)
4 credits. Not offered 2001–2002.]

GOVT 340 Latin American Politics @ (III)
Spring. 4 credits. H. Schamis.
This course is introductory lecture on the politics of Latin America. The main purpose is to view the region in a conceptual and comparative perspective. Country cases are introduced in order to understand the fundamental historical processes as well as to explain the significance of competing theoretical frameworks that have shaped the debate in the field. The course focuses on the political economies of the region in order to analyze the role of groups and classes under

different political regimes and contrasting strategies of development.

GOVT 341 Modern European Society and Politics (also SOC 341) (III)
Spring. 4 credits. S. Tarrow.
Since the French and industrial revolutions, modern Europe has been the major source of innovation and stability, freedom and imperialism, war and peace, capitalism and socialism, rule of law and state terror, and modernity and its critics. Even the 50-year division of the continent by the Cold War could not destroy its common, but contradictory heritage. This interdisciplinary core course in Modern European Studies serves as an introduction to European society and politics. Topics include European state-building and capitalism, nationalism and socialism, cycles of revolution and reaction, stratification and mobility, law and violence, and war and democracy. The course ends with an introduction to the European Union and its conflicts. May be taken separately, or in combination with GOVT 342, The New Europe, which focuses on contemporary Europe. If qualified student interest permits, a section may be offered in French or German.

[GOVT 342 United Germany in the New Europe (III)
4 credits. Not offered 2001–2002.]

GOVT 343 The Politics of European Integration (III)
Fall. 4 credits. J. Pontusson.
This course explores the policies and policy-making of the European Union against the backdrop of the postwar history of European integration and the institutional framework of the EU. We also explore how European integration is reshaping domestic political and economic arrangements in the member states of the European Union and current debates about the emerging European polity. The implications of Eastward enlargement for the EU, for the emerging market economies of Eastern Europe and for the process of Europeanization are considered in some depth.

[GOVT 346 Modern Japanese Politics @ (III)
4 credits. Not offered 2001–2002.]

GOVT 347 Government and Politics of China @ (III)
Fall. 4 credits. V. Shue.
An introduction to the main currents in China's domestic politics over the last 60 years. Topics include the revolutionary rise of communism; Maoism, in theory and in practice; the politics of bitterness during the "Cultural Revolution"; the evolving roles of the party and the military, and of peasants, workers, and intellectuals in the polity; the prospects for democracy, perceived social inequality, violence, corruption, and other pressing problems that have emerged with the reforms under Deng Xiaoping.

[GOVT 354 Capitalism, Competition, and Conflict in the Global Economy (III)
4 credits. Not offered 2001–2002.]

[GOVT 356 Enlarging the New Europe: Labor, Business, and Politics (also ILRIC 337) (III)
3 credits. Not offered 2001–2002.]

GOVT 357 American Indian Politics and Policy (also AIS 367 and R SOC 367) (III)
Fall. 3 credits. Enrollment limited to 20.
B. Baker.
This course addresses the Constitutional basis of the Federal-Indian Relationship through an examination of treaties, Supreme Court decisions, and Congressional law/policy. The effects of European and American forms of governance on traditional American Indian political structures are detailed and contrasted with contemporary tribal governments and political organizations. Issues relating to sovereignty and self-governance with respect to American Indian tribal governments are addressed relative to state and federal governments.

GOVT 358 Imagining the Modern Middle East (also NES 294, JWST 294) @ (III)
Fall. 4 credits. S. Aatout.
For description, see NES 294.

[GOVT 415 Race, Gender, and Organization (III)
4 credits. Not offered 2001–2002.]

GOVT 432 Model European Union II (III)
Fall. 2 credits. J. Pontusson.
This two-credit course is designed to prepare students to participate in the annual Model European Union Simulation held, on an alternating basis, at SUNY Brockport and in Brussels. The simulation provides an opportunity for participants, representing politicians from the member states of the European Union, to discuss issues and resolutions of current concern to the E.U. The preparatory course introduces students to the E.U., the country that the Cornell team will represent, and the issues to be discussed at the simulation. A substantial part of travel costs for the Cornell team will be paid by the Institute for European Studies, and course enrollment is restricted by budgetary considerations. Students enrolled in this course are required to write a research paper.

GOVT 433 The Politics of Economic Liberalization in the Developing World @ (III)
Fall. 4 credits. H. Schamis.
What drives the current processes of economic liberalization taking place in most of the developing world? What kinds of constraints and opportunities do governments embarked upon such policy reforms face? What types of factors account for their success or failure? What is the relationship between the international dimension of this phenomenon and the domestic political conditions? This seminar addresses these questions by examining the interplay of domestic and international ideas, local and foreign actors, and national and transnational institutions which take part in these processes. The course focuses extensively on, but is not limited to, Latin America.

[GOVT 436 Environmental Politics and Policy (III)
4 credits. Not offered 2001–2002.]

GOVT 437 Contemporary China: Society and Politics @ (III)
Spring. 4 credits. V. Shue.
Selected reading and in-class discussion of some of the central dilemmas that have been posed by the rapidly escalating processes of social change taking place under conditions of continuing political authoritarianism in China today. Topics include broad changes in demographic and social structure; rising tensions in family and gender relations; the enduring salience of community and workplace; the resurgence of Chinese nationalism, of ethnic nationalisms, of regionalism, and of popular religious movements; the significance of rising rates of crime and of political corruption; the growing crisis of social welfare delivery; and the limits on political dissent and on the development of civil society.

[GOVT 438 Contemporary China: Political Economy @ (III)
4 credits. Not offered 2001–2002.]

[GOVT 439 Japan in International Politics @ (III)
4 credits. Not offered 2001–2002.]

[GOVT 440 The Political Economy of Market Reform (also GOVT 630) (III)
4 credits. Not offered 2001–2002.]

[GOVT 448 The Quality of Democracy in Latin America @ (III)
4 credits. Not offered 2001–2002.]

GOVT 449/749 Politics and Magic: Popular Religion and Political Power in China @ (III)
Spring. 4 credits. V. Shue.
A course of readings, research, and seminar discussions illuminating the intersections, past and present, between popular religious organizations, mass spiritual movements, the exercise of state power, and the patterns of political dissent in China. Topics include the Taiping Heavenly Kingdom, the Boxer Uprising, Chinese medicine and contemporary charismatic healing cults, as well as the recent global rise (and repression in China) of the Falun Dafa movement.

[GOVT 456 Poor People's Movements (III)
4 credits. Not offered 2001–2002.]

[GOVT 458 Comparative Democratization (III)
4 credits. Not offered 2001–2002.]

Political Theory

GOVT 161 is recommended.

[GOVT 260 Social and Political Philosophy (also PHIL 260) (III or IV)
4 credits. Not offered 2001–2002.]

GOVT 293 Inequality, Diversity, and Justice (III or IV)
Fall. 4 credits. R. Miller.
See PHIL 193 for description.

GOVT 360 Ideology (III)
Spring. 4 credits. D. Rubenstein.
This course focuses on critical approaches to the study of ideology in order to understand the role of ideology in political subject formation. After an initial exploratory presentation of key Marxist (Marx, Gramsci, Althusser, Hebdige), structuralist/semiotic (Barthes, Eco) and psychoanalytic models (Freud, Lacan), we focus on specific ideologies of race, technology and gender. Students are required to write a 7–8 page take-home examination and a longer 10–12 page (double spaced) paper related to the issues addressed by the course material. A recommended bibliography is available to assist in the selection of the final paper topic.

[GOVT 364 The Selfish Individual and the Modern World (III)
4 credits. Not offered 2001–2002.]

GOVT 366 American Political Thought from Madison to Malcolm X (also HIST 316 and AM ST 366) # (III)
Fall. 4 credits. I. Kramnick.
A survey of American political thought from the eighteenth century to the present. Particular attention is devoted to the persistence of liberal individualism in the American tradition. Politicians, pamphleteers, and poets provide the reading. Insightful historical and social context is offered.

GOVT 369 Introduction to Feminist Political Thought (also WOMNS 359) (III)
Fall. 4 credits. N. Hirschmann.
This course provides a general introduction to feminist political thought, surveying various current issues and methodologies. The course combines analysis of women in western political thought and the relationship of feminism to the discipline of political science; readings by contemporary feminist theorists; and consideration of what theory can contribute to practical issues such as battering, pornography, prostitution, racism, sexuality, and sexual harassment.

GOVT 370 Political Theory and Cinema (also GERST 330, COM L 330, THETR 330) (III or IV)
Fall. 4 credits. G. Waite.
For description, see GERST 330.

[GOVT 375 Visual Culture and Social Theory (also ART H 370 and COM L 368) (III or IV)
4 credits. Not offered 2001–2002.]

GOVT 377 Concepts of Race and Racism (III)
Spring. 4 credits. A. M. Smith.
This course examines race and racism from a political theory perspective. We discuss the different types of racism: traditional racism, "new racism" or cultural racism, scientific racism and contemporary hybrid racism. We then examine the politically ambiguous "ethnicity theory." In the second half of the course, we consider the works by Marable on African American political economy; women of color feminist theorists; native American theorists; Takaki on Asian American labor history; and Hero on Latinos/Latinas and American politics. Although we discuss American multicultural history in some detail, our primary focus is on an investigation of these works' theoretical foundations.

[GOVT 461 Interpreting Race and Racism (III)
4 credits. Not offered 2001–2002.]

GOVT 462 Modern Political Philosophy (also PHIL 346) (III or IV)
Fall. 4 credits. R. Miller.
See Philosophy 346 for description.

GOVT 464 Theorizing the Public Sphere (also GERST 496) (III or IV)
Fall. 4 credits. P. U. Hohendahl.
For description, see GERST 496.

GOVT 465 Reconceiving Liberalism (also PHIL 447) (III or IV)
Spring. 4 credits. R. Miller.
For description, see PHIL 447.

[GOVT 466 Feminism and Gender Discrimination (III)
4 credits. Not offered 2001–2002.]

[GOVT 467 Radical Democratic Feminisms (III)
4 credits. Not offered 2001–2002.]

[GOVT 469 Limiting War (also PHIL 369) (III or IV)
4 credits. Not offered 2001–2002.]

[GOVT 470 Contemporary Reading of the Ancients (III)
4 credits. Not offered 2001–2002.]

[GOVT 471 The Cultural Theory of the Frankfurt School (also GERST 495, COM L 495) (III or IV)
4 credits. Not offered 2001–2002.]

[GOVT 473 Marx, Nietzsche, Freud (also GERST 415) (III or IV)
4 credits. Not offered 2001–2002.]

[GOVT 474 Community, Nation, and Morality (also PHIL 446) (III or IV)
4 credits. Not offered 2001–2002.]

International Relations

GOVT 181 is recommended.

GOVT 294 Global Thinking (also PHIL 194) @ (III or IV)
Fall. 4 credits. No prerequisites; intended for freshmen and sophomores. H. Shue.
For description, see PHIL 194.

[GOVT 380 The Politics of Modern Germany (III)
4 credits. Not offered 2001–2002.]

[GOVT 382 International Relations of East Asia @ (III)
4 credits. Not offered 2001–2002.]

GOVT 384 Contemporary International Conflicts (III)
Fall. 4 credits. J. J. Suh.
This is a survey of contemporary international conflicts. After a brief review of theoretical literature on the causes of conflict/war, we address some of the more salient international security issues such as proliferation of weapons of mass destruction, missile defense, civil wars, and ethnic conflicts. We also critically evaluate whether the use of force or outside intervention is helpful in mitigating the contemporary conflicts.

GOVT 385 American Foreign Policy (III)
Fall. 4 credits. M. Fanis.
This course provides an overview of the history of American foreign policy, concentrating on the period between 1914 and the present. Various theoretical approaches to the study of American foreign policy are covered, including international, domestic, and individual levels of analysis. These interpretations are used to examine events including: the First World War and the League of Nations; the rise of American hegemony; various crises of the Cold War, including the U-2 crisis, the Suez and Berlin crises, and the Cuban missile crisis; and the Korean, Vietnamese, and Gulf Wars. Emphasis is placed on security as opposed to economic foreign policy issues.

GOVT 386 The Causes of War (III)
Spring. 4 credits. C. Way.
This course surveys leading theories of the causes of interstate war B that is, large scale organized violence between the armed forces of states. Why is war a recurring feature of international politics? Are democracies more peaceful than other types of states, and if so what explains this "democratic peace"? Why do democratic publics seem to reward threats to use force by "rallying around the flag" in support of their governments? Does the inexorable pattern of the rise and fall of nations lead to cycles of great power wars throughout history? These and other questions are examined in our survey of theories of war at three levels of analysis: the individual and small groups, domestic politics, and the international system. Topics covered include: historical patterns in warfare; theoretical explanations for war; evaluation of the evidence for the various explanations; nuclear weapons; ethics and warfare; and the major security problems of the coming decades, civil war, and the prospects for peace in the future.

[GOVT 387 Political Psychology in International Relations (III)
4 credits. Not offered 2001–2002.]

[GOVT 388 International Political Economy (III)
4 credits. Not offered 2001–2002.]

[GOVT 389 International Law (III)
4 credits. Not offered 2001–2002.]

GOVT 390 International Relations and Film Theory (III)
Fall. 4 credits. J. Kirshner.
This course considers how ideas about major themes in the history of world politics have been expressed through film. The course includes a review of principal theories of international relations as well a consideration of visual analysis: how filmmakers express their ideas through the construction, juxtaposition, and manipulation of images. Topics such as World War I, the Cold War, and globalization are addressed and films discussed include *Paths of Glory*, *Lifeboat*, and *The Manchurian Candidate*.

GOVT 391 Chinese Foreign Policy @ (III)
Fall. 4 credits. A. Carlson.
In this course we examine the dramatic rise of China through review of the main themes and trends in contemporary Chinese foreign policy since the establishment of the People's Republic, and more specifically concentrating on major developments in Chinese foreign policy during the 1980s and 1990s. Such a survey involves not only a consideration of the evolution of China's relations with its major bilateral partners, but also investigating its changing relationship with international institutions and norms. In addition, students are asked to consider the extent to which Chinese foreign policy is simply a reflection of systemic and structural variables, such as shifts in the relative balance of power, and what role other factors, such as ideology, culture, leadership psychology, and/or domestic politics play. In short, we are exploring how important "China" is in determining the course of Chinese foreign policy.

[GOVT 392 International Relations of the Middle East (also NES 395) @ (III)
4 credits. Not offered 2001–2002.]

GOVT 393 Introduction to Peace Studies (also SOC 310) (III)
Fall. 4 credits. J. Reppy.
This course serves as an introduction to the study of war, peace, and peacemaking. We study different theories of peace and war from a variety of disciplinary perspectives. The course covers definitions of peace and war, causes of conflict, and modes of conflict prevention and resolution. The concepts are

applied to a range of historical and current conflicts. Students prepare analyses of specific conflicts or instances of peacemaking for class presentation.

GOVT 395 New Forces (Actors and Issues) in International Politics (III)
Spring. 4 credits. A. Carlson.
How important are regional groupings, non-governmental organizations, narco-terrorists, ethnic groups, and transnational environmental issues, within international politics? These forces seem to be occupying an increasingly central position in the international arena, yet the factors that have caused their rise, and the degree to which they have transformed the face of international politics, are still poorly understood. In this course we address such issues through exploring how students of international politics have described and explained the emergence of these new forces in the international system during the post-Cold War period. In short, the course focuses on determining the extent to which we are witnessing a transformation of the international political system, and why such a change is (or is not) taking place.

[GOVT 475 The Politics of International Monetary and Financial Relations (III)
4 credits. Not offered 2001–2002.]

[GOVT 477 Rational Choice Approaches to International Relations (III)
S4 credits. Not offered 2001–2002.]

[GOVT 478 Decision Making (III)
4 credits. Not offered 2001–2002.]

[GOVT 479 Sovereignty and International Relations (III)
4 credits. Not offered 2001–2002.]

[GOVT 481 Democracies in the International System (III)
4 credits. Not offered 2001–2002.]

GOVT 483 The Military and New Technology (also S&TS 483) (III)
Spring. 4 credits. J. Reppy.
In conventional wisdom, military organizations are seen paradoxically both as inflexible institutions and as proponents and consumers of rapid technological change. In this seminar we examine changes over time in the attitude of the military toward new technology and analyze competing explanations for these changes. Readings include Michael Howard, *War and European History;* John Ellis, *The Social History of the Machine Gun;* and Donald MacKenzie, *Inventing Accuracy: An Historical Sociology of Nuclear Missile Guidance.*

[GOVT 486 Gender, Nationalism, and Conflict (III)
4 credits. Not offered 2001–2002.]

GOVT 487 Asian Security (also GOVT 687) (III)
Spring. 4 credits. A. Carlson, J. J. Suh.
Throughout the 1990s it has been part of the conventional wisdom of international relations scholarship that Asia was, in the words of Aaron Friedberg, "ripe for rivalry." In this seminar we explore the accuracy of such an assessment through studying Asia's historical and contemporary security situation. Such an examination is oriented toward introducing students to the main security issues confronting Asia, alongside an exploration of the extent to which competing explanations drawn from different strands of IR theory and the security field can explain such issues. In addition, we ask students to challenge the limitations of traditional security studies through considering the importance of new actors and issue areas within the region. In short, while the seminar has a regional focus on east Asia, it is framed within the broader literature of the field.

GOVT 490 International Institutions (also GOVT 690) (III)
Fall. 4 credits. J. J. Suh.
This is a study of the ways in which units in the international system are constituted and how their interactions are institutionalized. We examine not only formal international organizations that have formal decision-making rules and palpable entities, but also "settled practices" the legitimize certain actions and de-legitimize others. We develop our theoretical understanding of international institutions by analyzing such issue areas as decolonization, human rights, the environment, and communications.

[GOVT 491 Conflict, Cooperation, and Norm: Ethical Issues in International Affairs (III)
4 credits. Not offered 2001–2002.]

Honors Courses

Late each spring a limited number of sophomore majors are admitted to the honors program, their work to begin the following fall. Application forms and a full description of the program may be obtained in 125 McGraw Hall.

GOVT 493 Studying Politics: The Junior Honors Seminar
Fall and spring. 4 credits. Fall, H. Schamis; spring, K. O'Neill.
The seminar meets twice weekly under the supervision of a senior faculty member with numerous classes being led by other members of the department faculty. The seminar surveys the broad range of what we mean by "the study of politics" and the various methods we enlist to carry out the study. The seminar is writing intensive, requiring at least five papers.

GOVT 494 Honors Seminar: Thesis Clarification and Research
Fall. 4 credits. A. M. Smith.
Each student works individually with a faculty member. The student initiates the tutorial by interesting a faculty member in his or her likely thesis project and by submitting to the director of undergraduate studies a form outlining the general area the thesis will treat and bearing the faculty tutor's signature. This form is due the third week of classes. The tutorial culminates in a 10- to 15-page paper setting forth the central questions to be addressed by the thesis, the state of existing knowledge regarding those questions, and why they matter.

GOVT 495 Honors Thesis: Research and Writing
Spring. 4 credits. Limited to students who have successfully completed GOVT 494.
Students continue the work of the preceding semester typically with the same faculty tutor. Research on the thesis is completed and writing begun. The tutorial culminates in a thesis of some 60 to 80 pages. The grade for the tutorial is determined by the faculty tutor, while the degree of honors (if any) awarded the thesis is decided by a committee of faculty members established for that purpose.

Independent Study

Independent study, GOVT 499, is a one-on-one tutorial which is arranged by the student with a faculty member of their choosing. GOVT 499 is open to government majors doing superior work, and it is the responsibility of the student to establish the research proposal and to find a faculty sponsor. Applicants for independent study must present a well-defined program of study that cannot be satisfied by pursuing courses in the regularly scheduled curriculum. No more than four credits of independent study may count toward fulfillment of the major. Students who elect to continue taking this course for more than one semester must select a new theme or subject each semester. Credit can be given only for work that results in a satisfactory amount of writing. Emphasis is on the capacity to subject a body of related readings to analysis and criticism. Keep in mind that independent study cannot be used to fulfill the seminar requirement. The application form for Independent Study is available in 125 McGraw Hall and must be completed at the beginning of the semester in which the course is being taken.

GOVT 499 Readings
Fall or spring. 1–4 credits.

Graduate Seminars

Qualified undergraduates are encouraged to apply for seminars listed with 600 course numbers but may only register with the permission of the instructor. Students may consult the supplement that lists graduate courses, available in the department office.

Field Seminars

GOVT 603 Field Seminar in American Politics
Fall. 4 credits. E. Sanders.
The basic issues and institutions of American government and the various subfields of American politics are introduced. The focus is on substantive information and theoretical analysis and problems of teaching and research.

GOVT 606 Field Seminar in International Relations
Spring. 4 credits. C. Way and J. J. Suh.
A general survey of the literature and propositions of the international relations field. Criteria are developed for judging theoretical propositions and are applied to the major findings. Participants are expected to do extensive reading in the literature as well as research.

[GOVT 607 The Western Political Tradition: A Survey
4 credits. Not offered 2001–2002.]

Methodology

GOVT 601 Scope and Methods of Political Analysis
Fall. 4 credits. W. Mebane.
This course introduces the major analytical approaches used in contemporary political science research. We touch on broad philosophical issues concerning the nature of theory and inference, the practices of cultural

and historical interpretation, and the relevance of moral values and political commitments. Several kinds of research designs, including comparative case study and quasi-experimentation, are briefly examined. The basic analytical ideas involved in statistical methods such as sampling and regression analysis are introduced, as are the basic concepts of the theory of collective choice and the elementary methods of applied game theory.

GOVT 602 Seminar in Political Methodology
Spring. 4 credits. J. Cowden and W. Mebane.
This course provides an introduction to some of the quantitative methods used in the social sciences. Topics discussed include elementary probability theory, random variables, functions of random variables, and sampling distributions; concepts of inference including point estimation, confidence intervals, and hypothesis testing; bivariate regression; and multiple regression.

GOVT 605 Comparative Methods
Spring. 4 credits. J. Pontusson.
This seminar provides a survey of different methodological approaches to the study of comparative politics: single case studies, comparative case studies based on Millian logic, qualitative comparative analysis, and a variety of quantitative methods. Substantive works are used to illustrate each approach. Throughout, the discussion emphasizes methodological issues that are common to all forms of comparative inquiry.

GOVT 707 Game Theory for Political Science
Fall. 4 credits. K. O'Neill.
Introduction to game theoretic models of politics. Lays out the logical basis of game theory at an accessible level, and demonstrates applications to topics in comparative politics, international relations, and American politics. Students achieve an understanding of the basic concepts of game theory, the ability to solve and to formulate simple games, and some knowledge of the basic models used in political science.

American Government and Institutions

GOVT 610 Political Identity: Race, Ethnicity, and Nationalism (also LSP 610)
Fall. 4 credits. M. Jones-Correa.
The social sciences generally treat ethnicity, nationalism, and race as descriptive categories or variables, while avoiding actually defining these categories, or thinking about how they should be used. The course seeks answers to the following questions: How should we go about describing ethnicity, nationalism, and race? Should we treat them as primordial or as social constructions? Much of the recent literature suggests the latter. If constructed, by whom are they constructed (or by what)? What constrains/structures these constructions? What purposes do these constructions serve? Whom do they serve? Are some constructions better representations of identity than others, and what does this mean? How should we go about applying these categories in political analysis?

[GOVT 611 The Political Economy of American Development, 1860–1900
4 credits. Not offered 2001–2002.]

GOVT 612 American Political Development in the 20th Century (co-taught with GOVT 404)
Spring. 4 credits. E. Sanders.
For description, see GOVT 404.

[GOVT 613/413 Finance, Federalism, and Politics
4 credits. Not offered 2001–2002.]

GOVT 615 State and Economy in Comparative Perspective
Fall. 4 credits. R. Bensel.
This course reviews the extensive literature on the political economy of comparative state formation and institutional change. Among the topics covered are war-making and state expansion, regime evolution and economic development, and market processes and class transformations. Although much of the reading and discussion focuses on the United States and Europe, the limits of these cases as theoretical prototypes for the remainder of the world is also considered.

[GOVT 620 The United States Congress
4 credits. Not offered 2001–2002.]

GOVT 623 The Politics of Courts
Fall. 4 credits. J. Rabkin.
All modern or westernized governments have judicial organs, designed to provide impartial decisions on certain kinds of disputes. But the kinds of issues that are left to courts vary widely from country to country and from era to era; the forms and degrees of political insulation for courts also vary widely; even the official rationales for such institutions vary a good deal. All of these differences are sometimes subjects of political controversy. This course will survey various forms and doctrines of judicial authority, seeking to clarify the relation between particular judicial models and the political systems in which they operate. Supra-national courts and administrative organs will be included in the survey, but principal emphasis will be on the role of courts in English-speaking countries.

[GOVT 703 Political Economy
4 credits. Not offered 2001–2002.]

GOVT 728 Government and Public Policy
Fall. 4 credits. T. J. Lowi.
For description, see GOVT 428.

Comparative Government

GOVT 630 The Political Economy of Market Reform
Spring. 4 credits. H. Schamis.
This seminar is open to advanced undergraduate and graduate students. It addresses the political economy of market reform in East–Central Europe and Latin America. Specifically, we study the relatively fast collapse of state socialism versus the long decline of import substituting industrialization, and their respective legacies on new economic and political systems. We focus on the role of major agents in the transformation process—the international system, coalitions of interest groups, political (especially state) institutions, and ideologies. Throughout the semester, we examine the emerging market societies in the east and the south in comparative fashion.

[GOVT 632 Politics and Society in Western Europe
4 credits. Not offered 2001–2002.]

[GOVT 638 Latin American Political Economy
4 credits. Not offered 2001–2002.]

GOVT 639 Studying Political Culture
Spring. 4 credits. D. Schirmer.
Selected readings deploying a range of differing approaches to the study of the relations between culture and politics. Discussion of central methodological and interpretive questions and paradigms including the linkage of cultural with structural explanations and the framing of informative comparisons across cultures. Readings and discussion focus on European and North American examples.

GOVT 641 Revitalizing Labor: A Comparative Perspective (also ILRIC 632)
Fall. 4 credits. L. Turner.
For description, see ILRIC 632.

[GOVT 642 Comparative Political Economy: East and Southeast Asia
4 credits. Not offered 2001–2002.]

GOVT 645 Chinese Politics
Fall 4 credits. V. Shue.
Review and assessment of several of the major currently competing approaches to the study of Chinese politics. Discussion and evaluation of leading works in the field analyzing Chinese state and society, policymaking and policy implementation, bureaucratic politics, elite politics, political culture, and political economy. Special attention to problems of research and interpretation.

[GOVT 653 The Plural Society Revisited (also ASIAN 607)
4 credits. Not offered 2001–2002.]

[GOVT 656 Comparative Political Economy
4 credits. Not offered 2001–2002.]

[GOVT 657 Comparative Democratization
4 credits. Not offered 2001–2002.]

GOVT 660 Social Movements and Contentious Politics (also SOC 660)
Fall. 4 credits. S. Tarrow.
This research seminar surveys the related fields of social movements and contentious politics. Using theories that derive from both the collective behavior and political process traditions of social movement research, the course seeks to broaden these into a general approach to contentious politics, applicable protest cycles, strike waves, nationalism, democratization and revolution. Students write review essays or research papers.

GOVT 692 The Administration of Agricultural and Rural Development
Spring. 4 credits. N. Uphoff.
For description, see INTAG 603.

[GOVT 731 Political Ecology
4 credits. Not offered 2001–2002.]

[GOVT 732 Postsocialist Transformations
4 credits. Not offered 2001–2002.]

[GOVT 735 Politics of South Asia
4 credits. Not offered 2001–2002.]

GOVT 749/449 Politics and Magic: Popular Religion and Political Power in China
Spring. 4 credits. V. Shue.
See GOVT 449 for description.

Political Theory

[GOVT 663 Political Theories of Power
4 credits. Not offered 2001–2002.]

[GOVT 665 American Political Thought: From Madison to Malcolm X
4 credits. Not offered 2001–2002.]

[GOVT 667 Major Figures in Modern Political Theory
4 credits. Not offered 2001–2002.]

GOVT 668 Major Figures in Modern Political Theory II: Freedom
Spring. 4 credits. N. Hirschmann.
A complementary course to GOVT 667, this graduate seminar allows students to continue intensive study of major figures in modern political theory through particular temporal or thematic lenses. While the focus changes from year to year, the seminar either engages in intensive analysis of two or three particular "great names" in the field of political theory, or focuses on a specific theme—such as freedom, justice, obligation—as it is treated by significant theorists of the modern era.

[GOVT 669 Modern Social Theory I (also GERST 669)
4 credits. Not offered 2001–2002.]

[GOVT 670 Modern Social Theory II (also GERST 670)
4 credits. Not offered 2001–2002.]

GOVT 671 Graduate Seminar in Feminist Political Theory
Fall 4 credits. The course is open to undergraduates who have taken GOVT 463 or other courses in feminist theory, with permission of the instructor.
N. Hirschmann.
This graduate seminar examines contemporary feminist theory from the perspective of political theory. We study the work of feminist theorists who work specifically within the discipline of political science, as well as the specifically political dimensions of work not generally considered political theory. Though particular readings and topics change from year to year in response to the most recent literature, in general the course focuses on questions of epistemology and methodology as a way to explore a variety of issues of relevance to feminism as an academic, intellectual, and political enterprise.

[GOVT 673 Republicanism and Liberalism
4 credits. Not offered 2001–2002.]

GOVT 674 Theory and Practice of Nationalism
Fall. 4 credits. D. Schirmer.
This course is devoted to the comparative study of the rise and transformation of nationalism, according to different theoretical and philosophical traditions. The relationship of nationalism to questions of race, gender, class, and time is also discussed on the basis of both theoretical and empirical studies.

[GOVT 675 Gramsci and Cultural Politics (also GERST 685)
4 credits. Not offered 2001–2002.]

[GOVT 676 Theories of Governmentality
4 credits. Not offered 2001–2002.]

[GOVT 679 Althusser and Lacan
4 credits. Not offered 2001–2002.]

[GOVT 760 Theoretical Approaches to Ideology
4 credits. Not offered 2001–2002.]

[GOVT 761 "The Sign of History": Kant and Lyotard (also GERST 693)
4 credits. Not offered 2001–2002.]

GOVT 762 Sexuality and the Law Seminar (also WOMNS 762)
Spring. 4 credits. A. M. Smith.
An advanced feminist theory/social theory/political theory/queer theory/legal theory seminar for graduate students. The seminar deals first with theoretical approaches to sexuality that build on and interrogate the post-structuralist approach that defines sexuality as a social construction, rather than an expression of a-historical instincts. Then we explore major works in the field that address issues in American politics such as the construction of "the family" in law; lesbian, gay, bisexual and transgender rights; the regulation of prostitution and public sex; eugenics and governmental population management initiatives; sex education, birth control, reproductive technologies and abortion politics; pornography, censorship and public arts funding; public policy responses to sexually transmitted diseases and the AIDS crisis; and the "family values" dimension of welfare policy. Our reading list includes the works of Michel Foucault, Martha Fineman, Janet Halley, Nancy Fraser, Judith Butler, Judith Walkowitz, Jeffrey Weeks, Linda Gordon, Mimi Abramowitz, Gwendolyn Mink, Dorothy Roberts, Zillah Eisenstein, Rosalind Petchesky, Nan Hunter and Lisa Duggan. Advanced undergraduate students are welcome to apply for admission to the seminar, but they are asked to satisfy, at minimum, the following prerequisites: at least one course in feminist theory and at least one course in American Government.

International Relations

GOVT 680 Sovereignty and International Politics
Fall. 4 credits. A. Carlson.
In recent years international relations theorists have become embroiled in an increasingly heated debate over the role of sovereignty in the contemporary international system. In this seminar we investigate the main aspects of this debate through paying particular attention to questions involving the historical evolution of sovereignty, and its contemporary meaning within an international system. The intent of such a course is not only to critically analyze sovereignty's role in international politics, but also to explore how the approach IR theorists take in regards to sovereignty informs their understanding of systemic and structural change within the international system. In addition, we consider the extent to which a series of competing explanations shed insight upon issues of continuity and change raised by the apparent rise of economic and political integration between states.

GOVT 681 Politics of Transnationalism
Fall. 4 credits. S. Tarrow.
Between the realism of traditional international relations and the constructivism of its critics, a new school of transnational politics has developed. Ranging from sociological institutionalists who examine transnational normative diffusion to students of international institutions who focus on non-state authority, to students of globalization and its discontents, scholars in this tradition examine the responses of actors in civil society to a globalizing world through their interactions with one another, with states, and with international institutions. The course traces the development of this area of research from its origins in the "old" transnational politics of the 1970s; examines critically the contributions of constructivism, sociological institutionalism, and global civil society; and proposes a model of the international system in which transnational actors—claiming to act as proxies for civil society groups—interact with states and international institutions. Particular attention is paid to the formation of transnational coalitions among social movements, transnational advocacy networks, state actors and agents of international institutions.

[GOVT 684 Strategies of Inquiry for International and Comparative Politics
4 credits. Not offered 2001–2002.]

[GOVT 685 International Political Economy
4 credits. Not offered 2001–2002.]

GOVT 687 Asian Security (also GOVT 487)
Spring. 4 credits. A. Carlson, J. J. Suh.
For description, see GOVT 487.

GOVT 688 Political Economy and National Security
Spring. 4 credits. J. Kirshner.
This seminar considers the relationship between economics and national security. Specific topics change from year to year, but typically include the following: the economic foundations of power, economic coercion, the economic roots of conflict, and the ways in which structural changes in the international economy shape and limit state authority.

GOVT 689 International Security Politics
4 credits. Not offered 2001–2002.]

GOVT 691 Normative Elements of International Relations
Fall. 4 credits. H. Shue.
We examine selected normative elements of international affairs, divided into three interlocking clusters. First are issues about conflict, including both low-intensity military intervention and nuclear weapons. Second are questions about cooperation, especially between rich nations and poor nations. Third are debates about the authority and status of the major players in the international system: individual persons, nation-states, and international regimes. Questions considered include: is the retention by some nations of nuclear weapons morally justified? Is the world economy unjust? Should national governments be pressured to respect individual human rights?

Independent Study

This course is *NOT* open to undergraduates. Undergraduates wishing to conduct supervised study should register for GOVT 499.

GOVT 799 Independent Study
Fall or spring. 4 credits.
GOVT 799 is a course of individualized readings and research for graduate students. Topics, readings, and writing requirements are designed through consultation between the student and the instructor. Graduate students in government who are looking to use this as an option to fulfill their course requirements should check with their chairs to be certain that the program of study is acceptable for this purpose. Applications must be completed and signed by the instructor and by the chairs of their special committees. They are available from, and must be returned to, the graduate assistant in 125 McGraw Hall.

GREEK

See Department of Classics.

HEBREW

See Department of Near Eastern Studies.

HINDI-URDU

See Department of Asian Studies.

HISTORY

S. Greene, chair; V. Caron, director of graduate studies; R. Weil, director of undergraduate studies; S. Blumin, T. Borstelmann, V. Caron, S. Cochran, R. Craib, P. R. Dear, M. C. Garcia, K. Graubart, S. Greene, P. Holquist, I. Hull, P. R. Hyams, J. J. John, C. Kammen, M. Kammen, S. L. Kaplan, J. V. Koschmann, D. C. LaCapra, W. F. LaFeber, T. L. Loos, R. L. Moore, J. M. Najemy, M. B. Norton, C. Peterson, J. R. Piggott, S. Pohl, R. Polenberg, W. B. Provine, M. J. Roldan, J. H. Silbey, M. Steinberg, B. Strauss, E. Tagliacozzo, D. Usner, M. Washington, R. Weil, J. H. Weiss, D. Wyatt

Emeritus: D. A. Baugh, K. Biggerstaff, W. M. Pintner, F. Somkin, B. Tierney

The popularity of history among Cornell students is due to its usefulness as preparation for graduate, professional, or law school and for any career that requires critical thinking and good writing; the reputation of the faculty for scholarship, teaching, and advising; and most of all, the intrinsic interest of the discipline. A wide variety of introductory and advanced courses is offered. The department is particularly strong in ancient, medieval, and modern European history; in American, Latin American, and Asian history; and in the history of science.

Advanced Placement and International Baccalaureate

Advanced placement and International Baccalaureate credit awarded by the College of Arts and Sciences counts towards the 120 credits needed for graduation, but does not count toward completion of the history major. Students earning a 4 or 5 in the Advanced Placement Examination or a 6 or 7 in the International Baccalaureate history examinations are urged to enroll in intermediate or advanced history classes. Students who are unsure about their qualification should consult the instructor.

The Major

To complete the history major, a student must fulfill the requirements listed below:

Entry requirement: completion of *any* two History courses excluding First-Year Writing Seminars.

1) Take nine history department courses (for either 3 or 4 credits each), completing all of them with a grade of C or better. (Courses taken for entry may count towards fulfilling the major.)
2) Of the total nine courses:
   a) four must be outside of American history and
   b) three must be in history before 1800.

   Courses used to fulfill requirement (1) above may also be used to fulfill Requirement (2), in respect both to (a) and (b) if applicable. A course in American history before 1800 may be used to fulfill Requirement (2b). A course before 1800 in a field other than American history can be used toward fulfillment of both Requirements (2a) and (2b).
3) Of the total nine courses, one must be a 400-level seminar. HIST 400 may be used to fulfill this requirement. Appropriate 400-level seminars may be used to fulfill Requirements (2a) and (2b).

Honors

The history department offers an honors program for students who wish to research and write a thesis during their senior year. In addition to writing the thesis, honors students must maintain a 3.5 average in their history courses, take the Honors Proseminar (History 400) plus an additional 400-level seminar, preferably during their junior year, and complete 10 courses in history (for 3 or 4 credits each). During the second term of the sophomore year or early in the junior year, interested students should speak to a faculty member or faculty adviser about the honors program.

Before the beginning of the senior year, the candidate presents, in conversation or in writing, a thesis proposal to an appropriate member of the faculty. The faculty member who approves the proposal ordinarily becomes the thesis supervisor. If for any reason it is necessary to change supervisors, this arrangement should be confirmed no later than the fourth week after the beginning of the candidate's senior year.

Honors candidates should register in HIST 401, Honors Research, with their supervisors. Any exceptions to this must be approved by the Honors Committee. HIST 401 is a four-credit course that permits honors candidates to conduct research and to begin writing the honors essay. At the end of the first semester of the senior year, as part of the requirements for HIST 401, the student submits to the supervisor a 10- to 15-page overview, or, alternatively, a preliminary draft of some part of the thesis along with an outline of the whole and meets with a committee consisting of the student's supervisor and one other department member who will eventually serve as a reader of the thesis. That committee then recommends whether the student may proceed to enroll in HIST 402, Honors Thesis, during the final semester of the senior year. HIST 402 is a four-credit course that permits honors candidates to complete the honors essay and to demonstrate their understanding of the ways in which the themes explored in the thesis fit into a larger historical context.

The completed thesis is evaluated by three readers, including the two faculty members who administered the preliminary oral interview in December.

The text of the honors essay may not exceed 60 pages except by permission of the chair of the honors committee and the student's supervisor. Two copies are due during the third or fourth week of April. In May each honors candidate is given an oral examination administered by the supervisor; examination focuses on the essay as well as the specific subfield of history in which the student has conducted research (e.g., Periclean Athens, seventeenth-century science, nineteenth-century American politics).

To qualify for a bachelor of arts degree with honors in history, a student must (1) sustain at least a 3.5 cumulative average in all history courses and (2) earn at least a cum laude grade on the honors essay and on the oral examination.

Cornell-in-Washington Program. History majors may apply to the Cornell-in-Washington program to take courses and undertake a closely supervised externship during a fall or spring semester.

Course Offerings

Comparative history

History of science

American history

Latin American history

African history

Asian history

Near Eastern history

Ancient European history

Medieval, Renaissance, and early modern European history

Modern European history

Honors and research courses

Course Numbering System

100–level courses are very general introductory courses (like 151–152, 190–191) and freshman writing seminars.

200-level courses come in two kinds: seminars or lecture courses. Neither kind has prerequisites and both admit freshmen.

200-level seminars (which are identified by the name "seminar" in the title) are similar to first-year writing seminars, except that there is greater emphasis on subject matter and less on writing.

200-level lecture courses cover a relatively broad geographical area, period of time, or subject.

300–399-level courses may have specified prerequisites or deal with more-specialized subjects than do those numbered 250–299. Admission of freshmen varies from course to course and is indicated in the course descriptions.

400–499 are upper level undergraduate courses.

600–699 and 700–799 are graduate level courses.

Comparative History

[HIST 274 Foodways: A Social History of Food and Eating # (III)
Fall. 4 credits. Not offered 2001–2002.
S. L. Kaplan.
An interdisciplinary examination of the validity of the adage "man is what he eats." Among the topics: food and nutrition, food and social structure, the politics of food control, food and modernization, taste making, and food in religion and literature. Cases are drawn widely

across space and time, from Pharaoh's Egypt to the 1990s.]

HIST 360 Early Warfare, East and West # (III)
Fall. 4 credits. C. Peterson.
A study of the principal modes of warfare found both in the East and the West from ancient times up to the eighteenth century. Tactical evolution and the impact of innovations are stressed, but attention is also paid to the general social and cultural background and the role of nonmilitary factors.

[HIST 380 Social History of Western Technology # (III)
4 credits. Not offered 2001–2002. J. Weiss.
For description, see History of Science.]

[HIST 393 Images of Humanity in Medieval China (also ASIAN 393) @ # (III)
Fall. 4 credits. Prerequisite: any course on premodern China or Chinese religions, or permission. Not offered 2001–2002. C. Peterson.]

[HIST 409 Seminar on Work in Europe and America # (III)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002; next offered 2002–2003. S. L. Kaplan.
A comparative study of the meaning of work in different societies from premodern times to the present. Emphasis is on the "representations" of work of the actors themselves who worked, as well as of those, who for various critical reasons, did not work. The seminar examines not only ideology but also the organization, practice, and physical place of work. It explores theory as well as "cases," and draw on anthropological and sociological as well as historical materials.]

[HIST 432 The City in History: Europe and America # (III)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002; next offered 2002–2003. S. Blumin.
Reading and discussion of significant interpretations of the rise, role, and character of cities in medieval and early modern Europe and in modern Europe and America. Individual research projects.]

[HIST 454 The Herodotean Moment: The Uses and Abuses of "Western Civilization" (also GOVT 454) # (III)
Spring. 4 credits. Limited to 20 students. Prerequisite: permission of instructor. Not offered 2001–2002. J. Najemy, M. Bernal.]

History of Science

HIST 250 Technology in Society (also ENGRG 250, ECE 250, and S&TS 250) (III)
Fall. 3 credits. R. Kline.
For description, see ENGRG 250.

[HIST 280 The Sciences in the Twentieth Century (also S&TS 283) (III)
Spring. 4 credits. Not offered 2001–2002. M. A. Dennis.
Science emerged as a powerful source of social, economic, and political power during the twentieth century. Through an examination of the development of the sciences—physical and biomedical—during the twentieth century, students learn about the reciprocal relations between science and society. Topics covered may include the rise and development of quantum mechanics; the emergence of Big Science; the history of the sciences in totalitarian nations, especially the former Soviet Union, Nazi Germany, and Communist China; the evolutionary synthesis; the rise and fall of molecular biology; the multiple forms of eugenics; the changing character of the social sciences; the role of new technologies in scientific change, especially computer and communication technology; the growth of science as a profession; and the development of science in non-Western cultures.]

HIST 281 Science in Western Civilization (also S&TS 281) # (III)
Fall. 4 credits. HIST 281 is not a prerequisite to 282. P. R. Dear.
This course aims to make comprehensible both to science majors and to students of the humanities the historical structure and development of modern science and to show science as a cultural phenomenon. Changing perceptions of nature and human knowledge from Greek Antiquity to the twentieth century form the framework for current Western views of the world, while the roots of the present-day dominance of "science" as a symbol of progress and modernity lie in an alliance between knowledge of nature and power over nature that took shape in the nineteenth century after a long period of emergence. 281 runs chronologically up to the death of Isaac Newton and focuses on the cultural traditions of Christian Europe and its selective appropriation of a Greek heritage.

HIST 282 Science in Western Civilization (also S&TS 282) # (III)
Spring. 4 credits. HIST 281 is not a prerequisite to 282. P. Dear.
This course aims to make comprehensible both to science majors and to students of the humanities the historical structure and development of modern science and to show sciences as a cultural phenomenon. Changing perceptions of nature and human knowledge from Greek Antiquity to the twentieth century form the framework for current Western views of the world, while the roots of the present-day dominance of "science" as a symbol of progress and modernity lie in an alliance between knowledge of nature and power over nature that took shape in the nineteenth century after a long period of emergence. This course covers the eighteenth, nineteenth, and early twentieth centuries.

HIST 287 Evolution (also BIO EE 207, S&TS 287) (I or III)
Fall or summer. 3 credits. W. Provine.
For description, see BIO G 207.

HIST 292 Inventing an Information Society (also ENGRG 298, ECE 298, and S&TS 292) (I or III)
Spring. 3 credits. R. Kline.
For description, see ENGRG 298.

[HIST 380 Social History of Western Technology # (III)
Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. J. Weiss.
Studies in the interaction between technological changes and social changes in Western Europe and America since the eighteenth century. Readings and lectures deal both with instances of social transformation that accompanied technological changes and with the role of technology in social thought and cultural expression. Special attention is paid to three periods: Britain during the Industrial Revolution, America in the nineteenth century, and America during the Vietnam War.]

HIST 415 Seminar in the History of Biology (also BIO G 467, B&SOC 447, S&TS 447) (I or III)
Summer (6-week session). 4 credits. W. Provine.
Specific topic changes each year.

HIST 471 Knowledge and Politics in Seventeenth Century England (also S&TS 473) # (III)
Spring. 4 credits. Limited to 15 students. P. Dear and R. Weil.
England in the 17th century was a revolutionary ferment of political, religious, and philosophical conflict. This course examines the conflicts and arguments, and the means explored for their apparent resolution. These affected ideas of God and worship, the meanings of gender, conceptions of the natural world and its scientific appropriation, and the legitimacy and proper form of political power. The course focuses on the close study of primary source readings by many of the principal players in all these areas, including Francis Bacon, Thomas Hobbes, the Duchess of Newcastle, and John Locke.

HIST 525 Seminar in the History of Technology (also S&TS 525)
Spring. 4 credits. R. Kline.
For description, see S&TS 525.

[HIST 616 Enlightened Science (also S&TS 416)
Fall. 4 credits. Not offered 2001–2002; next offered 2002–2003. P. R. Dear and M. A. Dennis.
"Science" is a term that is often associated with "rationality." The idea that "reason," rather than "faith" or "tradition" should be the pre-eminent guide to practical action has deep roots in the thought of eighteenth-century Europe, the period known as the Enlightenment. The practice and image of science in the Enlightenment shows how this ideal was developed and understood, and what its meanings and implications were. Those meanings, and their associated values, remain strongly with us today. This course investigates our current scholarly understanding of many themes and issues relating to "enlightened science," and studies writings of the period itself in a variety of topical areas, from political economy to astronomy and natural history, in several national contexts including Scotland, France, and Germany. We attempt to view these materials from the perspective both of developments from earlier periods and in relation to the later consequences of this ideology.]

[HIST 680 Seminar in Historiographical Approaches to Science (also S&TS 680)
Fall. 4 credits. Not offered 2001–2002. P. R. Dear.
Examines philosophical, sociological, and methodological dimensions of recent historiography of science.]

[HIST 682 Topics in the Scientific Revolution (also S&TS 682)
Fall. 4 credits. Not offered 2001–2002. P. R. Dear.
This is a graduate seminar devoted to investigation of recent scholarship and issues in sixteenth- and seventeenth-century European knowledge of nature. Students are expected to produce a substantial paper focused on the study of primary source documents. Topics include: credibility and social status; the academic environment;

philosophy and court culture; and the situated meaning of experiment.]

[HIST 711 Introduction to Science and Technology Studies (also S&TS 711)
Fall. 4 credits. Not offered 2001–2002. S. Hilgartner.
For description, see S&TS 711.]

HIST 713 Issues in History of Technology
Spring. 3 credits. R. Kline.
For description, see S&TS 700.3.

American History

HIST 101 Introduction to American History (also AM ST 103) # (III)
Summer and fall. 4 credits. 101 is not a prerequisite for 102. M. B. Norton.
A survey of American history from the beginnings through the Civil War. Topics include cultural encounters in the age of Columbus, European colonization, the American Revolution, the early republic, antebellum reform movements, and the coming of the Civil War.

HIST 102 Introduction to American History (also AM ST 104) (III)
Summer and spring. 4 credits. 101 is not a prerequisite for 102. F. Dunaway.
An introductory survey of the development of the United States since the Civil War.

[HIST 201 Seminar: Immigration and Ethnicity in Twentieth-Century U.S. (III)
Spring. 4 credits. Seminar designed for underclassmen but open to all students. Enrollment limited to 15 students. Prerequisite: permission of instructor. Not offered 2001–2002. M. C. Garcia.
This seminar looks at immigration to the United States in the twentieth century, highlighting the experiences of several groups as case studies. We analyze the "push/pull" historical-structural factors that compelled people to come to the United States; the nature of cultural and structural assimilation; nativist movements; the evolution of U.S. immigration policy; and the formation of ethnic identity in U.S. society. Attention is given to current issues such as immigration reform, bilingual education; and the multiculturalism debate.]

[HIST 202 Comparative Migration in the Americas (also AM ST 204 and LSP 203) @ (III)
Spring. 4 credits. Letter grade only. Not offered 2001–2002. M. C. Garcia.
A seminar examining migration both within and to the Americas in the nineteenth and twentieth centuries. Topics to be discussed are the reasons for population movements; immigration policies; social, economic, and political accommodation; nativist and restrictionist responses; women and migration; remittances and transnationalism. Among the immigrant-receiving nations studied are Argentina, Brazil, Canada, Cuba, Mexico, and the United States.]

HIST 208 Seminar: The Era of Franklin D. Roosevelt (also AM ST 208) (III)
Fall. 4 credits. Seminar designed for underclass students but open to all students. Enrollment limited to 15 students. Prerequisite: permission of instructor. R. Polenberg.
The impact of the Great Depression and World War II on American politics, law, and culture.

[HIST 209 Seminar: Political History of Indians in the United States (also AIS 209) # (III)
Fall. 4 credits. Seminar designed for underclassmen but open to all students. Enrollment limited to 15 students. Prerequisite: permission of instructor. Not offered 2001–2002. D. Usner.
An investigation of political organization and change among Native American societies. Discussions and assignments examine forms of tribal government, diplomacy, and warfare, as well as political relations with European colonies and the United States. Specific topics include pan-Indian confederacies, Indian policy, struggles over sovereignty, and Indian strategies of autonomy and resistance.]

[HIST 210 The Atlantic World from Columbus to Equiano # (III)
Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. R. J. Weil and M. B. Norton.
After Europeans first crossed the Atlantic in the late fifteenth century, the ocean became a vast highway linking the European powers—Spain, France, Britain, and the Netherlands—with their colonial outposts in America. This seminar explores the Atlantic world through reading such primary sources as the log of Christopher Columbus and the autobiography of Olaudah Equiano, an Anglo-African sailor, and recent scholarly examinations of the slave trade and other aspects of the Atlantic economy. Intended primarily for sophomore prospective history majors; open to others by permission of instructors.]

HIST 212 African-American Women in the Twentieth Century (also AM ST 212 and WOMNS 212) (III)
Spring. 4 credits. Sophomore seminar. M. Washington.
An examination of twentieth-century themes significant in the historical experience of Black women. Major emphasis is on race, gender, community, art, and politics in post World War II America. Specific topics include African-American women's involvement in such areas as political activism at the electoral and grass-root levels; socio-economic issues affecting women and the community; religion; representation and participation of Black women in art and entertainment; and issues specific to gender cross-racially as well as intra-racially.

HIST 213 Asian American History (also AAS 213) (III)
Fall. 4 credits. Staff.
Comparative introductory history of Asian Indians, Chinese, Filipino, Japanese, and Koreans in the U.S. from about 1850 to World War II. Themes include U.S. expansionism in the Pacific, Asian migrant labor in Hawaii and the American West, the anti-Asian movement, and Asian resistance.

HIST 214 Seminar on American Foreign Policy (also AM ST 214) (III)
Fall. 3 credits. Prerequisite: permission of instructor. W. LaFeber.
Topic for fall 2001: U.S. Presidential power and foreign relations since the 1890s.

[HIST 238 History of Women in the Professions, 1800 to the Present (also AM ST 258, WOMNS 238, and HD 258) (III)
Spring. 3 credits. Not offered 2001–2002. J. Brumberg.
For description, see HD 258.]

[HIST 251 Black Religious Traditions from Slavery to Freedom (also AM ST 251, RELST 251) (III)
Fall. 4 credits. Sophomore seminar. Letter only. Not offered 2001–2002. M. Washington.
A survey on the black religious and spiritual traditions during bondage and the early years of freedom. The course examines slave religion, the rise of black churches in the North, the formation of black churches after the Civil War, the independent church movement and the churches' role in social protest.]

[HIST 260 Introduction to U. S. Latino History, Part I (also LSP 260 and AM ST 259) (III)
Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. M. C. Garcia.
This course introduces students to the history of Latinos in the United States. We focus specifically on the history of Chicanos (Mexican Americans) and Central Americans. Part II of this course, History 261, focuses on the history of Puerto Ricans, Cubans, and Dominicans in the U.S. (students are not required to take both courses). Among the topics addressed are: historical immigration patterns and the "push/pull" factors that compelled migration to the United States; the social and political events that shaped the evolution of these Latino communities; and the role of cultural identity, race, class, and gender in shaping experience; and the role of foreign policy in formulating immigration policy.]

HIST 261 Introduction to U.S. Latino History, Part II (also LSP 261 and AM ST 261) (III)
Spring. 4 credits. M. C. Garcia.
This survey discusses the history of Latinos from the Caribbean: the Puerto Ricans, Cubans, and Dominicans. Students are introduced to some of the most important historical and theoretical works in this field. Topics discussed include the push-pull/historical-stuctural factors that influenced migration to the United States; the historical evolution of these communities; the role of cultural identity, as well as race, class, and gender in shaping experience; and the intersection of foreign policy and immigration policy.

[HIST 273 Women in American Society, Past and Present (also WOMNS 273) # (III)
Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. M. B. Norton.
A survey of women's experiences in America from the seventeenth century to the present. Among the topics discussed are women's familial roles, the changing nature of household work, the women's rights movement, employment of women outside the home, racial and ethnic differences in women's experiences, and contemporary feminism.]

[HIST 276 American Indian History, 1500–1850 (also AIS 276 and AM ST 272) # (III)
Fall. 4 credits. Not offered 2001–2002. D. Usner.
A survey of North American Indian history from the sixteenth century to the mid-nineteenth century. Relations between Indian Nations and with European colonies are explored. Different cultural groups and cross-cultural encounters are compared, with emphasis on resistance and adaptation to European colonialism. The formative years of U.S. Indian policy and the experiences of Indian people through the removal era receives close attention.]

[HIST 277 American Indian History Since 1850 (also AIS 277 and AM ST 277) (III)
Spring. 4 credits. Not offered 2001–2002. D. Usner.
A historical study of American Indians in the United States and Canada from the mid-nineteenth century to the present. The active and complex role played by Indian people in their responses to government policies and to socioeconomic changes is emphasized. Challenges faced and initiatives taken by Indians are traced from the early reservation years to the current era of self-determination. Cultural change and continuity within Indian communities is closely examined.]

[HIST 303 African-American Women in Slavery and Freedom (also WOMNS 307 and AM ST 303) # (III)
Spring. 4 credits. Letter only. Not offered 2001–2002. M. Washington.
Historical exploration of African-American women from a sociopolitical perspective. Topics include women in Africa, slavery and freedom, sexuality, labor, the family, and gender crossracially beginning with the African background and ending at 1900.]

[HIST 304 American Culture in Historical Perspective, 1880–1980 (also AM ST 304) (III)
Spring. 4 credits. Not offered 2001–2002. M. Kammen.
An introduction to the study of modern American culture. Emphasis is on the role of culture in the quest for national identity; the function of cultural myths and myth making; the advent of modernism; relationships between mass culture, popular culture, and high culture; and the question of American exceptionalism (distinctiveness). Special attention is also paid to the situation of subcultures and regions, to the changing role of entertainment in relation to leisure, the media, ethnicity (pluralism), and the decorative and popular arts.]

[HIST 311 The Structure of American Political History (also AM ST 311) # (III)
Fall. 4 credits. Not offered 2001–2002. J. Silbey.
Examines the course of American politics from the eighteenth century to the Gilded Age, focusing on the development of American political culture, the nature of decision making, and the role of social conflict, mass behavior, political parties, and political elites in shaping our political history.]

[HIST 312 The Structure of American Political History (also AM ST 312) (III)
Spring. 4 credits. Not offered 2001–2002. J. Silbey.
A continuation of HIST 311 but can be taken independently. Examines the course of American politics from the 1890s to the present, focusing on the massive transformation of American political life in the late nineteenth and twentieth centuries in response to industrialism and urbanization, the depression, and the international crises from the 1930s to the 1990s.]

[HIST 313 U.S. Foreign Relations, 1750–1912 # (III)
Fall. 4 credits. Not offered 2001–2002. W. LaFeber.
Examines the development of the U.S. continental and global empires by analyzing policy and policymakers from Benjamin Franklin to Woodrow Wilson. Emphasis is placed on domestic events that shaped foreign policy. In conjunction with HIST 313, a special course, 301, for discussion and guided research is offered.]

[HIST 314 History of American Foreign Policy, 1912 to the Present (also AM ST 314) (III)
Spring and summer. 4 credits. Not offered 2001–2002. T. Borstelmann.
Students examine the emergence of the United States as a world power in the twentieth century. The course focuses on the domestic sources of foreign policy and the assumptions of the major policymakers (Wilson through Clinton). Important themes include the American response to a revolutionary world since 1912, the Cold War, the Third World, and the increasingly dominant role of the president in the making of U.S. foreign policy.]

HIST 316 American Political Thought: From Madison to Malcolm X (also AM ST 376 and GOVT 366) # (III)
Fall. 4 credits. I. Kramnick.
For description, see GOVT 366.

HIST 318 American Constitutional Development (also AM ST 317) (III)
Fall. 4 credits. Not open to freshmen. R. Polenberg.
Major issues in constitutional history. Topics include: the drafting of the Constitution; the Bill of Rights; the Marshall era; the crises caused by slavery and emancipation; the rise of substantive due process; Holmes, Brandeis, and freedom of speech; the Roosevelt "revolution"; civil liberties and civil rights in modern America; the right of privacy; the contemporary Supreme Court.

[HIST 321 Colonial North America to 1763 # (III)
Fall. 4 credits. Not offered 2001–2002. M. B. Norton.
A survey of European settlement in North America and the Caribbean, emphasizing the interactions of Europeans, Indians, and Africans; economic development; gender relations; religious and political change; and the impact on the colonies of internal and external conflicts.]

[HIST 324 Varieties of American Dissent, 1880–1900 (also AM ST 324) (III)
Fall. 4 credits. Not offered 2001–2002. N. Salvatore.
The idea of dissent in American society raises a variety of images. Civil rights activists, striking workers, and student radicals of the 1960s are familiar symbols of dissent. But might we understand a Pentecostal believer, filled with the spirit of his or her God in critiquing contemporary society, as an example of American dissent? This course explores the varieties of economic, political, and cultural dissent in America between 1880 and 1990, and examines how understanding dissent in its specific historical context illuminates major aspects of American life and culture.]

HIST 325 Age of the American Revolution, 1754–1815 (also AM ST 322) # (III)
Spring. 4 credits. M. B. Norton.
An examination of the process by which the 13 English colonies became an independent and united nation, with emphasis on political thought and practice, social and economic change, and cultural development. Attention is paid to the impact of the American Revolution on women, Blacks, Indians, and white males.

[HIST 327 American Frontier History before 1850 # (III)
Spring. 4 credits. Not offered 2001–2002. D. Usner.
An overview of European exploration and colonization in North America, life on different colonial-Indian frontiers, and territorial expansion by the United States. Topics include the ideological and material frameworks of expansionism, the political and social dimensions of interethnic and imperial rivalry, and the formation of U.S. Indian and land policies. Themes of human migration, commercial development, and environmental change are emphasized.]

HIST 329 Indians, Settlers, and Slaves in the Early South (also AIS 329) # (III)
Spring. 4 credits. D. H. Usner.
History of the American South from the sixteenth century to the early nineteenth century with an emphasis on intercultural relations. Topics include colonization of the region by Spain, England, France, and the United States, American Indian adaptation and resistance, the evolution of slavery, African American relations with European and Indians, and the role of racial ideology and ethnic identity in the formation of the South as a distinct section of the United States.

[HIST 330 The Age of Jackson, 1815–1850 (also AM ST 330) # (III)
4 credits. Not offered 2001–2002. J. Silbey.]

HIST 331 The American Civil War and Reconstruction 1850–1877 (also AM ST 331) # (III)
4 credits. J. Silbey.
An analysis of the factors leading up to the breakup of the Union, the impact of the war in North and South, and the problems of restoration and reconstruction of the seceded states.

[HIST 332 The Urbanization of American Society: 1600–1860 (also AM ST 332) # (III)
Fall. 4 credits. Not offered 2001–2002. S. Blumin.
America was born in the country and moved to the city. This course examines the transformation of America from a rural to a rapidly urbanizing society and culture, from the first European settlements to the era of the Civil War. It is also a history of the city itself, as a human community, and as a crucible of cultural contact and change.]

HIST 333 The Urbanization of American Society: 1860–2000 (also AM ST 333) (III)
Spring. 4 credits. 332 is not a prerequisite to 333. S. Blumin.

America was born in the country and moved to the city. This course examines the transformation of America from the urbanizing society and culture of the mid-nineteenth century to the thoroughly metropolitan nation of the present. It is also a history of the city itself, as a human community, a crucible of cultural contact and change, and a focus of public policy.

[HIST 335 African-American History from Slavery to Freedom # (III)
Fall. 4 credits. Letter only. Not offered 2001–2002; next offered 2002–2003. M. Washington.
Introductory course on African-Americans from 1619 to 1865. Emphasis is on life in bondage, the free black communities, and racism. Other topics include African cultural heritage, the slave trade, religion, the family, and the black freedom struggle.]

[HIST 336 Capitalism and Society in Developing America, 1607–1877 (also AM ST 336) # (III)
Fall. 4 credits. Not offered 2001–2002. S. Blumin.
An examination of American society in the context of capitalist development, and of capitalism as a social phenomenon. The transformation of pre-industrial colonies into an industrializing nation; the development of social classes; the emerging ethos of free enterprise.]

[HIST 337 Entrepreneurialism and Organization in the Age of the Corporation: Capitalism and Society in Modern America, 1840–2000 (also AM ST 337) (III)
Spring. 4 credits. Not offered 2001–2002. S. Blumin.
An examination of American society in the context of capitalist development and of capitalism as a social phenomenon. The rise of corporate capitalism; class, "mass", and the ethos of enterprise in twentieth-century American society.]

[HIST 340 Recent American History, 1925–1960 (also AM ST 340) (III)
Spring. 4 credits. Not open to freshmen. Not offered 2001–2002. R. Polenberg.
Topics include the Sacco-Vanzetti case; radicalism and reform in the New Deal; Franklin Roosevelt and World War II; the Holocaust and the atomic age; the Cold War and civil liberties; individualism and conformity in the 1950s.]

HIST 341 Recent American History, 1960 to the Present (also AM ST 341) (III)
Summer and fall. 4 credits. Not open to freshmen. R. Polenberg.
Topics include the Supreme Court and civil rights; Kennedy, Johnson, and social reform; the Vietnam War and Watergate; politics and the presidency from Carter to Clinton; and class, race, and ethnicity in modern America.

[HIST 345 The Intellectual and Cultural Life of Nineteenth-Century Americans (also AM ST 345 and RELST 345) # (III)
Spring. 4 credits. Not offered 2001–2002. R. L. Moore.
An examination of the development of cultural and intellectual diversity in the United States. Particular emphasis is placed on religious pluralism.]

[HIST 346 The Modernization of the American Mind (also AM ST 346) (III)
Fall. 4 credits. Not offered 2001–2002. R. L. Moore.
American thought and culture from 1890 to the present. Emphasizes the intellectual impact of major political and economic events and the adaptation of social ideas and values to new conditions.]

HIST 347 American Environmental History (also AM ST 347) (III)
Fall. 4 credits. F. Dunaway.
This course provides an introduction to American environmental history, an exciting and relatively new field of scholarship. Ranging from the colonial period to the present, we explore how different groups of Americans have interacted with the natural world.

[HIST 359 American Families in Historical Perspective (also AM ST 359, HD 359, and WOMNS 357) (III)
Spring. 3 credits. Prerequisite: HD 150 or one 200-level social science or history course. S-U grades optional. Human ecology students must register for HD 359. Not offered 2001–2002. J. Brumberg.
For description, see HD 359.]

[HIST 375 The African-American Workers, 1865–1910: The Rural and Urban Experience (also ILRCB 385) # (III)
Fall. 3 credits. Prerequisite: juniors and seniors, or permission of instructor. Not offered 2001–2002. N. Salvatore.
For description, see ILRCB 385.]

[HIST 376 The African-American Workers, 1910–the present: Race, Work, and the City (III)
Not offered 2001–2002. N. Salvatore.
For description, see ILRCB 386.]

[HIST 378 Topics in U.S. Women's History (also AM ST 378 and WOMNS 378) (III)
Fall. 4 credits. Preference given to students who have taken HIST/WOMNS 273, HIST/WOMNS 303, or HIST/WOMNS 238. Others: by permission of instructor only. Not offered 2001–2002; next offered 2002–2003. M. B. Norton.
Topic for 2003: Gender and Sexuality in America. A colloquium course, limited to 20 students. Students read and discuss some of the new scholarly work on gender and sexuality in American history. They also prepare several written and oral presentations based on their analyses of primary sources in the Cornell Human Sexuality collection and elsewhere.]

HIST 411 Undergraduate Seminar in American Political History (also AM ST 411) (III)
Spring. 4 credits. Prerequisite: permission of instructor. J. Silbey.
Topic for spring 2002: Abraham Lincoln.

HIST 414 Motivations of American Foreign Policy (III)
Fall. 4 credits. Prerequisite: permission of instructor. W. LaFeber.
Topic for fall 2001: Woodrow Wilson's impact on U.S. foreign relations, 1912 to the present.

[HIST 418 Undergraduate Seminar in the History of the American South (III)
4 credits. Not offered 2001–2002. J. Silbey.]

HIST 419 Seminar in American Social History (also AM ST 419) (III)
Spring. 4 credits. S. Blumin.
Topic for 2002: Race, class and the American city in the nineteenth and twentieth centuries. Offered in Cornell-in-Washington program.

[HIST 421 Undergraduate Seminar in Cultural History (also AM ST 421) (III)
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002; next offered 2002–2003. M. Kammen.]

[HIST 426 Undergraduate Seminar in Early American History # (III)
Spring. 4 credits. Not offered 2001–2002. M. B. Norton.]

[HIST 428 Comparative History of Colonial North America # (III)
Fall. 4 credits. Not offered 2001–2002. D. Usner.
This seminar considers ways of comparing how different European empires, especially Spain, France, and England, colonized North America from the sixteenth through the eighteenth centuries. Settlement patterns, labor systems, trans-Atlantic connections, and Indian relations are examined for similarities and differences across imperial boundaries. Borders between colonial and frontier regions, where empires came face-to-face, are also explored. Problems and opportunities for comparative study, found in old and new scholarship on early America, are critically discussed.]

[HIST 429 Undergraduate Seminar in Indians of Eastern North America (also AIS 429) # (III)
Spring. 4 credits. Not offered 2001–2002. D. Usner.
A seminar examining the history of Native Americans in the eastern woodlands from colonial times to the present. The cultural and economic participation of Indians in the evolution of frontier societies is examined. Major topics include fur-trade networks, political relations, removal, and the persistence of Indian communities in eastern states.]

[HIST 430 America in the Camera's Eye (III or IV)
Fall. 4 credits. Not offered 2001–2002. R. L. Moore.
Photographs and films have become archives for historical research. From the era of Matthew Brady's Civil War images, the United States has been recorded by documentary photographers who have called attention to the country's progress and it's poverty. Hollywood filmmakers have also recorded endless images of the American landscape and placed against that landscape fictionalized accounts of the country's history and its social problems. What can we learn from these images? What is their relation to written texts and to other documents that tell us about the past? How truthful is documentary? How misleading is Hollywood? One key text is James Agee's and Walker Evans' *Let Us Now Praise Famous Men*. The seminar meets once each week for discussion and periodically during the semester to view films.]

[HIST 432 The City in History: Europe and America # (III)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. S. Blumin.
Reading and discussion of significant interpretations of the rise, role, and character

of cities in medieval and early modern Europe, and in modern Europe and America. Individual research projects.]

HIST 439 Reconstruction and the New South (also AM ST 439) # (III)
Fall. 4 credits. Limited to 15 students. M. Washington.
This course focuses on the American South in the nineteenth century as it made the transition from Reconstruction to new forms of social organization and patterns of race relations. Reconstruction is considered from a sociopolitical perspective, concentrating on the experiences of the freed-people. The New South emphasis includes topics on labor relations, economic and political changes, new cultural alliances, the rise of agrarianism, and legalization of Jim Crow.

[HIST 440 Undergraduate Seminar in Recent American History (also AM ST 440) (III)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. R. Polenberg.
Topic: freedom of speech, censorship, and the Supreme Court.]

[HIST 442 Religion and Politics in American History: From J. Winthrop to R. Reed (also AM ST 442 and RELST 442) (III)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. R. L. Moore.
A reading and research seminar concerned with popular culture in nineteenth-century America (publications, performances, and audiences).]

HIST 455 The Four Seasons Motif in American Culture (also SOC HUM 405 and AM ST 430.2) (III)
Fall. 4 credits. Limited to 15 students. Permission of instructor required. M. Kammen.
The focus of this seminar is one of the most ubiquitous and pervasive motifs in all of the arts (painting, literature, and music) in the northern hemisphere, both West and East: **The Four Seasons**. We view works of art and films, read fiction, non-fiction, and poetry, and listen to music. Although we must devote serious attentions to the Old World origins, dispersion, and local permutations of this motif, more than half of the seminar given over to American manifestations and writings about the seasons, with particular attention to changes over time as well as geographical variations.

[HIST 458 Female Adolescence in Historical Perspective (also WOMNS 438 and HD 417) # (III)
Spring. 3 credits. Limited to juniors and seniors. Prerequisite: permission of instructor. Not offered 2001–2002. J. Brumberg.
For description, see HD 417.]

[HIST 484 Seminar in the History of American Labor: Race, Work, and the City (also ILR 304) (III)
Fall. 4 credits. Open to juniors and seniors only with the permission of the instructor. Not offered 2001–2002. N. Salvatore.
For description, see ILRCB 304.]

HIST 486 Seminar on the 1960s (also AM ST 486) (III)
Fall. 4 credits. T. Borstelmann.
This course explores the issues and developments of the most turbulent and significant decade in recent U.S. history. Major topics include the civil rights movement, the Kennedy and Johnson administrations, the Vietnam War, the anti-war movement, the counterculture, the women's liberation movement, and the Nixon administration. A substantial research paper is required.

HIST 494 Cross-Culturality in the Caribbean (also S HUM 420) (III)
Spring. 4 credits. Limited to 15 students. S. Shukla.
For description, see S HUM 420.

HIST 500 Undergraduate Research Seminar (also AM ST 500)
Fall and spring. 8 credits each term. S. Blumin and others.
Offered in Cornell-in-Washington Program. An intensive research and writing experience utilizing the extensive resources of Washington, D.C.

[HIST 521 Seminar in American Cultural Studies (also AM ST 521)
Fall. 4 credits. Not offered 2001–2002. M. Kammen.
The focus is the relationship between government and culture in historical perspective. After three contextual sessions devoted to nineteenth-century background, we are mainly concerned with the period from the 1930s to the present. Several comparative sessions are devoted to government as a patron of culture in other societies. A research paper is required.]

[HIST 607 Writing Seminar on African-American Women
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002; next offered 2002–2003. M. Washington.
This course is designed for students actively engaged in a writing project on African-American women's history. Students must have already done the research and most of the reading for their papers prior to enrollment. Reading and class discussion focus on style, methodology, and theory. An extensive research paper is due at the end of the semester.]

[HIST 608 African-American Women
Spring. 4 credits. Prerequisite: permission of instructor. Letter only. Not offered 2001–2002; next offered 2002–2003. M. Washington.
A reading and discussion topics seminar focusing on the experiences of African-American women in nineteenth- and twentieth-century America, including the Caribbean.]

[HIST 610 Afro-American Historiography
Fall. 4 credits. Letter only. Not offered 2001–2002. M. Washington.
Reading and discussion course focusing on the way historians write and interpret the Black experience in America. Students will be concerned with individual historians, various schools of thought, and historical approaches.]

[HIST 613 Seminar on American Diplomatic History
Fall. 4 credits. Not offered 2001–2002. T. Borstelmann.
A reading and research seminar in twentieth-century American diplomatic history, emphasizing the Cold War period and interpretive approaches to U.S. foreign policy. A research paper is required.]

[HIST 617 Seminar in American Cultural History
4 credits. Not offered 2001–2002. Semester TBA. R. L. Moore.]

[HIST 618 Seminar in American Cultural History
Spring. 4 credits. Not offered 2001–2002. R. L. Moore.
A reading and research seminar concerning selected topics in nineteenth century America.]

[HIST 621 Graduate Seminar in American Cultural History
Fall. 4 credits. Not offered 2001–2002. M. Kammen.]

[HIST 624 Graduate Seminar in American Indian History (also AIS 624)
Spring. 4 credits. Not offered 2001–2002. D. Usner.
This seminar examines, through a selected series of major topics and problems, the historical study of North American Indians. Various approaches in history—together with anthropology, political science, folklore, and other disciplines—are explored. Emphasis is placed on current interpretations and directions.]

[HIST 626 Graduate Seminar in the History of American Women (also WOMNS 626)
Spring. 4 credits. Not offered 2001–2002. M. B. Norton.
A reading and research seminar intended primarily for graduate students. Major works in American women's history and carefully scrutinized, and each student prepares a lengthy research paper.]

[HIST 627 Graduate Seminar in Early American History
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002; next offered 2002–2003. M. B. Norton.]

[HIST 633 Seminar in Nineteenth-Century American History
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. J. Silbey.]

[HIST 634 Seminar in Nineteenth-Century American History
Spring. 4 credits. Not offered 2001–2002. J. Silbey.
A research seminar intended primarily for graduate students exploring society, culture, and politics of the United States between 1815 and 1896.]

HIST 640 Graduate Seminar in Recent American History
Fall. 4 credits. Prerequisite: permission of instructor. T. Borstelmann.
A graduate research seminar that will examine American political and social history since 1945.

HIST 683 Seminar in American Labor History (also ILRCB 783)
Fall. 3 credits. Prerequisites: graduate students only. N. Salvatore.
For description, see ILRCB 783.

[HIST 710 Colloquium in American History
Spring. 4 credits. Required of all first-year graduate students in United States history. Not offered 2001–2002. M. Kammen.
Examination of major approaches, periods, issues, and modes of interpreting American history. Readings include recent "classics" of

American scholarship from diverse subfields and genres.]

Latin American History

HIST 206 Modern Mexico @ (III)
Fall. 4 credits. R. Craib.
A survey of Mexico's history from the early nineteenth century to the present. The course covers social, cultural and economic trends and their relationship to political movements. Topics include rural and urban movements; U.S.-Mexican relations; the Revolution of 1910; indigenismo; popular culture; NAFTA; and the Zapatistas.

HIST 216 Gender and Colonization in Latin America @ (III)
Spring. 4 credits. K. Graubart.
This seminar addresses questions of gender (and sometimes sexuality) in the conquest and colonization of Latin America. We look at the gendered aspects of colonization itself, as well as the experiences of women and men of various ethnicities and classes between the 15th and 19th centuries.

HIST 219 Mexican Immigration to the United States (also LSP 219, AM ST 219) (III)
Fall. 4 credits. J. Cárdenas.
For description, see LSP 219.

HIST 224 Art and Politics in Twentieth-Century Latin America @ (III)
Fall. 4 credits. Prerequisite: permission of instructor. M. Roldan.
This seminar examines how the intersection of art and politics shaped culture, ideology, and identity in Latin America from the Mexican Revolution to the dictatorships of the late twentieth century. Topics may include muralism and the Mexican Revolution; the artist as muse and activist (Frida Kahlo); working class and immigrant culture in Argentina and the tango; samba as social and political protest in Brazil; gender and politics in exiled women's literature; and the appropriation of public spaces as artistic forum and means of communication under authoritarian regimes.

HIST 295 Colonial Latin America @ # (III)
Fall. 4 credits. K. Graubart.
Survey of Spanish America from the rise of pre-Columbian civilizations through the European conquest, the establishment and development of colonial societies, imperial rivalries in the New World, the background of the independence movements, and the achievement of political independence.

HIST 296 Modern Latin America @ (III)
Spring. 4 credits. R. Craib.
An introductory survey of Latin American history from the early nineteenth century to the present with particular emphasis on processes of nation-state formation and the development of capitalist economies. Prominent themes include neocolonialism; revolutionary movements and radicalism; ethnic, gender, and class relations; and the United States-Latin American relations.

HIST 418 Agrarian History (III)
Fall. 4 credits. R. Craib.
A comparative, interdisciplinary examination of agrarian life from a broad temporal and geographical perspective. Strong emphasis on recent historiography, methodology and theory. Major themes include rural rebellion, resistance, and crime; capitalist transformation of the countryside; agrarian custom and practice; and the way in which rural life has been romanticized, denigrated, and essentialized. Readings include works of history, fiction, literary theory, anthropology, and geography.

HIST 423 Chronicles of the Conquest of Latin America @ (III)
Spring. 4 credits. K. Graubart.
In this seminar we examine the writings of participants in the conquest and colonization of Latin America. Readings include writings by European conquistadors, Amerindian elites, and non-alphabetic materials from the early colonial period. In particular we investigate how the history of the conquest itself and of the societies that existed prior to this contact were produced by its participants, with special attention to questions of ethnicity, gender, and class.

HIST 438 History's Margins: Frontiers and Borders in Comparative Perspective (III)
Spring. 4 credits. R. Craib.
A comparative seminar on borders and frontiers. Primary emphasis is on the Mexican-U.S. border. Central themes include the historical transformation of frontiers into borders; colonialism and imperialism; and immigration and nation-state formation. Attention is also given to situating the revived interest in borders in relationship to contemporary economic, political, and social changes. Readings include works of fiction, literary theory, history, science studies, and postcolonial criticism.

[HIST 445 Prostitutes and Patriots: Urban Culture and the Construction of Citizenship in Latin America, 1880–1950 (also HIST 645) @ (III)
Fall. 4 credits. Prerequisites: HIST 295 and/or 296 suggested. Permission of instructor required. Enrollment limited to 15. Not offered 2001–2002. M. Roldan.
Unprecedented demographic and economic changes gave rise to debates by the late nineteenth century regarding the definition of citizenship and the limits of individual participation in Latin American societies. These debates centered on the city—the symbol of both "progress" and "disorder". Rising tensions were expressed through the trope of the "prostitute" (disease and loss of control) and the "patriot" (science, statesmanship, and order). The course examines changing notions of the private/public; the regulation of sexuality and gender; popular mobilization; and the construction of the nation.]

HIST 649 Seminar in Latin American History
Fall. 4 credits. M. Roldan.
A graduate-level seminar focusing on changing topics in Latin American history (politics, labor; race/ethnicity; violence; social movements, agrarian society, etc.). In addition to weekly meetings to discuss readings, students are expected to conduct original research culminating in a final 25- to 30-page paper.

African History

[HIST 255 Cultures and Controversies in Precolonial Africa @ # (III)
Fall. 4 credits. Not offered 2001–2002. S. Greene.
This course examines the history of Africa, focusing on a selected set of political communities whose pre-colonial histories help us to understand controversies raging today. Who were the ancient Egyptians? What "race" were they and is this important anyway? If so, why? What role did women and men, slaves and free, kings and commoners play in ancient Mali, the Swahili city-states in Rwanda, and what can this information tell us about these societies today? What role did the slave trade play in influencing the current economic position of Africa and race relations in the U. S. today? We explore these and other questions.]

HIST 256 Sophmore Seminar: Riot and Revolution in Nineteenth-Century Africa: The Birth of the Modern @ # (III)
Spring. 4 credits. S. Greene.
The beginning of the nineteenth century witnessed the rapid and often times forceful expansion of Islam in West Africa, the transformation of the Zulu from a small, inconsequential people to the largest and most powerful ethnic group in South Africa, and a major riot by enslaved peoples in east Africa. This course explores these revolutionary changes and upheavals as Africa remade itself to face the modern era. Lectures, readings and discussions focus on the causes and consequences of these events and their significance for understanding contemporary Africa.

[HIST 443 The European as Other @ (III)
Fall. 4 credits. Prerequisite: permission of instructor. Limit 15. Not offered 2001–2002. S. Greene.]

HIST 604 The Colonial Encounter @
Fall. 4 credits. Prerequisite: permission of instructor. S. Greene and T. Loos.
The course examines the way colonizer and colonized influenced the culture, history, and identity of the other. Emphasis is on exploring the colonial encounter as a phenomenon in itself. We consider both sides of the unequal equation that linked specific European countries (for example, France, England, Germany, the Netherlands) with the states they colonized in Africa and Asia. This linkage challenged, at different times and in different places, pre-existing understandings of self, country, and culture, and notions about the other.

Asian History

[HIST 190 Introduction to Asian Civilizations @ # (III)
Spring. 4 credits. Not offered 2001–2002. J. Piggott and staff.
An introduction to the distinctive cultures of China, India, Japan, and Southeast Asia that features an intensive examination of selected topics and periods of particular significance in the history of each.]

HIST 191 Introduction to Modern Asian History (also ASIAN 191) @ (III)
Fall. 4 credits. S. Cochran and T. Loos.
The history of Asia-Pacific from the nineteenth century to the present, focusing on relations of China, Japan, and Southeast Asia with each other and with the West.

[HIST 203 War and Diplomacy in Korea @ (III)
Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. B. Strauss.

Korea's challenging location between great powers, its long struggle between independence and outside control, and its tragic division, all make for a singular case study in the history of war and diplomacy. This course examines that history with particular focus on the Imjin War (1592–1598) and the Korean War (1950–1953). Topics include geopolitics, military tactics, and strategy on the Korean peninsula; Admiral Yi Sun-Shin as strategist and tactician; the effect of war on Korean society; and the pattern of Korean relations with China, Japan, Russia (and other northern Asian powers), and the United States.]

[HIST 207 The Occidental Tourist: Travel Writing and Orientalism in Southeast Asia (also ASIAN 206 and HIST 507) @ (III)

Spring. 4 credits. Letter grade only. Not offered 2001–2002. T. Loos.

Students read travel literature about Southeast Asia in the nineteenth and early twentieth centuries and travel accounts written by Southeast Asians living abroad. The seminar emphasizes themes of race, orientalism, transculturation, and authenticity. We critically assess the transformative potential of the Internet on (virtual) tourism. Graduate students should register for HIST 507 and are expected to participate in the HIST 207 seminar. Preference is given to students with Internet experience.]

HIST 218 Introduction to Korea (also ASIAN 218) @ (III)

Fall. 3 credits. Staff.

For description see ASIAN 218.

[HIST 230 Seminar in History and Memory: The Asia-Pacific War @ (III)

Fall. 4 credits. Seminar designed for underclassmen but open to all students. Enrollment limited to 15 students. Not offered 2001–2002; next offered 2002–2003. J. V. Koschmann.

This seminar examines what is at stake when the fighting between Japan and its former enemies in the Pacific during World War II is remembered, memorialized, and (re)constructed as historical narrative by Japanese, Americans, and others. By exploring the legacies of such events and processes as the Rape of Nanking, live testing of biological and chemical warfare agents, sexual slavery, and incendiary bombings of Hiroshima and Nagasaki, the seminar offers an opportunity to reflect in a more general way on the politics of historical representation and memory.]

[HIST 243 Seminar: China and the West before Imperialism @ # (III)

Spring. 3 credits. Seminar designed for underclassmen but open to all students. Enrollment limited to 15 students. Prerequisite: permission of instructor. Not offered 2001–2002. C. Peterson.

What accounts for the first great passion for things Chinese in the West (from the sixteenth to the nineteenth centuries) followed by the hostility characteristic of imperialism? This seminar explores this question relying heavily on original sources to trace the China vogue in thought, literature, and art and comparing the Western image with the realities of China of that day.]

HIST 249 Peddlers, Pirates, and Prostitutes: Subaltern Histories of Southeast Asia, 1800–1900 (also HIST 648 and ASIA 249/648) @ # (III)

Spring. 4 credits. E. Tagliacozzo.

This course examines Southeast Asian history "from below" over the course of a single century, 1800–1900. Laboring histories, the history of piracy and prostitution, and the pasts of people usually considered "marginal" to the state are all discussed. How do we look for clues to these peoples' lives? Were there similarities in experience across disparate geographies? What did it mean to be an outlaw, "deviant," or poor in colonial Southeast Asia? This course attempts to answer these questions.

HIST 284 Southeast Asia in the World System: Capitalism and Incorporation, 1500–Present (also HIST 684 and ASIAN 284/684) @ # (III)

Fall. 4 credits. Graduate students should enroll in HIST 684. E. Tagliacozzo.

This course examines the history of Southeast Asia in conjunction with what theorists have called the emerging "World System." The expanding reach of capitalism is traced through the region's Early Modern "Age of Commerce"; through the age of great European merchant companies; through the coercive capitalism of the imperial age; and into our own times. Throughout, attention is paid to similar (or dissimilar) trends in the rest of global history, spanning Europe, Africa, Middle East, and the Americas. Open to students with an interest in Southeast Asian history, as well as the shaping forces of capitalism on the modern world.

HIST 289 The U.S.-Vietnam War (also ASIAN 298) @ (III)

Fall. 3 credits. K. Taylor.

This is a survey of events in Vietnam, the U.S., and elsewhere related to U.S. intervention in Vietnam from the 1940s to 1975. Readings include historical narratives, memoirs, and literature. Alternative ways of understanding this war in context of Vietnamese and American history are explored.

[HIST 293 History of China up to Modern Times @ # (III)

Fall. 4 credits. Not offered 2001–2002. C. A. Peterson.

A survey of the principal developments in the history of China from the earliest times to the eighteenth century that also undertakes a topical introduction to Chinese culture and civilization, in part by the use of visual materials.]

HIST 294 History of China in Modern Times (also ASIAN 294) @ (III)

Spring. 4 credits. S. Cochran.

A survey that concentrates on the rise of the last imperial dynasty in the seventeenth and eighteenth centuries, the upheavals resulting from domestic rebellions and foreign imperialism in the nineteenth century, and the twentieth-century efforts to achieve social mobilization, political unity, and commercial expansion.

HIST 297 Japan Before 1600 (also HIST 597 and ASIAN 297/597) @ # (III)

Fall. 4 credits. J. Piggott.

This course explores Japan before 1600 from a variety of perspectives. Analysis of primary sources, including literary and archaeological artifacts, is emphasized. HIST 297 is a good introduction to issues of premodern historical study and to the study of East Asia. (Graduate students or more advanced undergraduates who would like to do a research project should register for HIST 597).

[HIST 322 History of *Samurai* # @ (III)

Spring. 4 credits. Not offered 2001–2002. J. Piggott.

This course explores the role of the *samurai* at various epochal moments, and the effects *samurai*-centered governance has had on society and culture up to the early modern era. This is very much a hands-on course in which analysis and writing are emphasized. Recommended: HIST 297. Graduate students are welcome but they should register for HIST 522 after consultation with the instructor.]

[HIST 326 History of the *Samurai* II @ # (III)

Fall. 4 credits. Prerequisite: HIST 322. Not offered 2001–2002. J. Piggott.

We continue study of themes and issues introduced in HIST 322, wherein the origins of the *samurai* from eighth-century roots through the era of the first warrior government during early medieval times are traced. This course covers the *samurai* through 1600.]

[HIST 328 State, Society, and Culture in Modern Japan @ (III)

Spring. 4 credits. Not offered 2001–2002. J. V. Koschmann.

A survey of Japan from early-nineteenth century to the present, which attempts to connect the political, socio-economic, and imaginative realms of modern Japanese life so as to achieve a complex view of modern Japanese society. Pays particular attention to the changing situation of women and women's movements, Japan's relations with Asia and the United States, and problems of historical representation and consciousness. Readings include Japanese works in translation as well as secondary sources.]

HIST 360 Early Warfare, East and West # (III)

Fall. 4 credits. C. A. Peterson.

For description see Comparative History.

HIST 388 Vietnamese Histories (also HIST 688 and ASIAN 385/685) @ # (III)

Fall. 3 credits. K. Taylor.

For description see ASIAN 385.

[HIST 393 Images of Humanity in Medieval China (also ASIAN 393) @ # (III)

Fall. 4 credits. Permission required. Not offered 2001–2002. C. A. Peterson.]

HIST 395 Southeast Asia to the Eighteenth Century (also HIST 695) @ # (III)

Fall. 4 credits. D. Wyatt.

A survey of the earlier history of Southeast Asia, concentrating particularly on regional movements of economic, social, cultural, and political change and using, to the extent possible, readings in translated primary sources.

HIST 396 Southeast Asian History from the Eighteenth Century (also HIST 696 and ASIAN 396/696) @ (III)

Spring. 4 credits. S-U option. T. Loos and E. Tagliacozzo.

Surveys the modern history of Southeast Asia with special attention to colonialism, the Chinese diaspora, and socio-cultural institutions. Considers global transformations that

brought "the West" into people's lives in Southeast Asia. Focuses on the development of the modern nation-state, but also questions the narrative by incorporating groups that are typically excluded. Assigns primary texts in translation.

HIST 416 Undergraduate Seminar on Gender and Sexuality in Southeast Asia (also ASIAN 416 and WOMNS 416) @ (III)
Spring. 4 credits. Letter grade only. T. Loos.
Students consider the relationships among colonialism and gender and sexual identity formation in Southeast Asia. Using material from a wide range of fields including anthropology and literature, the course complicates a simplistic East/West and male/female binary.

[HIST 420 Japan in the Year 1000: *The Tale of Genji* in Historical Perspective @ # (III)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. J. Piggott.
The *Tale of Genji* is a classic of premodern Japanese literature that provides readers a broad view into Japan's courtly society at a time when many of the elements of Japan's classical tradition were taking form. Those interested in premodern Japan, Comparative Literature, and courtly societies will find the seminar of great interest. Previous study of premodern Japan is advised.]

[HIST 448 Family and Gender Relations in Premodern Japan # @ (III)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002; next offered 2002–2003. J. Piggott.
An inquiry into structures of family and gender relations in the classical and medieval periods. Themes will include kinship and family organization, state formation, and gender construction. Those interested in comparative perspectives are encouraged to enroll. Breadth reading, primary source materials, and comparative reading placing Japan in an East Asian context are emphasized. Previous study of premodern Japan and East Asia is recommended.]

HIST 451 Crime and Diaspora in Southeast Asian History, 1750–1950 (also HIST 650 and ASIAN 450/651) @ # (III)
Fall. 4 credits. E. Tagliacozzo.
During the last two centuries, the mass movement of people in Southeast Asia has increased to an unparalleled scale. This course examines the diasporas of various Asian peoples in this time frame, and asks how these movements have intersected with notions (and actions) of "criminality" in the region. Historical sources, period literature, and anthropological writings are used to analyze the growth of migration, smuggling syndicates, and "illicit" behavior in Southeast Asia. Open to students with an interest in Southeast Asian history and the region's links to the wider Asian orbit.

[HIST 466 Kings and Shoguns: the *Taiheiki* Age @ # III
Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. J. Piggott.
The turn of the fourteenth century witnessed epochal changes in Japan as structures of monarchy, court-*Bakufu* relations, landholding, judiciary, international relations, and popular culture were deeply affected by the failure of Go-Daigo Tenno's royal restoration. Core readings of the seminar include portions of the martial epic, the *Taiheiki*, and other materials from which insights into these transformations can be drawn. Previous study of Japanese history, especially HIST 322, is highly recommended.]

[HIST 476 Senior Seminar: Comparative Colonial Law and Society (also ASIAN 476) @ III
Fall. 4 credits. Letter grade only. Limited to 15 students. Not offered 2001–2002. T. Loos.
Students explore topics including: hybrid jurisprudence, notions of public and private, religious codes, family, and national identity that resulted from colonial policies. Most readings focus on law, society in colonial Southeast Asia. Readings may include theoretical material on law and society and historical material about jurisprudence in Europe that informed colonial categories of law in the colonies. Relevant comparative readings outside the scope of Southeast Asia are also included.]

[HIST 480 Senior Seminar: Gender Adjudicated (also WOMNS 480 and ASIAN 482) @ # III
Fall. 4 credits. Letter grade only. Limited to 15 students. Not offered 2001–2002. T. Loos.
Students explore the intersections among jurisprudence, religious codes, gender, family, and national identity in Southeast Asia from the colonial period to the present.]

[HIST 489 Seminar in Modern Japanese History @ III
Fall. 4 credits. Prerequisites: HIST 298 or equivalent knowledge of modern Japanese history. Not offered 2001–2002. J. V. Koschmann.]

HIST 490 Tales of the Heike (also ASIAN 490/690 and HIST 690) @ # III
Fall. 4 credits. Prerequisite: previous study of pre-1600 Japan or permission of instructor. Limited to 15 students. J. Piggott.
Medieval Japan was crisscrossed by an assortment of minstrel monks who sang the heroic exploits of fighting men—samurai—in the late twelfth century. The resulting *Tale of the Heike* (Heike Monogatari) was later compiled in its current form by the master chanter Kakuichi during the 14th century. It has been called "Japan's first national epic," because listening to it, enjoying it, and identifying with it brought people of all strata and regions together as nothing had done before. In this seminar we will investigate the *Tale of the Heike* from various historical and literary perspectives.

HIST 492 Undergraduate Seminar in Medieval Chinese History @ # III
Fall. 4 credits. Prerequisite: HIST 190, 293, 360, or permission of instructor. C. A. Peterson.
Topic for fall 2001: The Cultural, Social and Intellectual Life of the Medeival Chinese Literati.

HIST 493 Problems in Modern Chinese History (also HIST 693) @ III
Fall. 4 credits. Prerequisite: HIST 294 or permission of instructor. S. Cochran.
Conflicting interpretations of Chinese history during the late imperial period and the first half of the twentieth century.

[HIST 495 Kings and States: Asian Models @ # III
Spring. 4 credits. Prerequisite: previous coursework in East Asian history and permission of instructor. Not offered 2001–2002. J. Piggott.
The seminar explores kingship and state formation in comparative perspective. In addition to participating in discussions focused on core readings, seminar members undertake research projects targeting a society of their choice. Students interested in the history of preindustrial societies, political and cultural anthropology, political science, and religion will find the seminar of interest.]

HIST 499 Problems in Modern Chinese History (also HIST 694 and ASIAN 499/694) @ III
Spring. 4 credits. Prerequisite: HIST 294 or permission of instructor. S. Cochran.
This course gives each student an opportunity to select one research topic and work on it throughout the semester. Knowledge of Chinese is not required, but background in Chinese studies is needed.

HIST 507 Graduate Seminar: The Occidental Tourist
Spring. 4 credits. T. Loos.
For description see HIST 207.

[HIST 588 Proseminar in Modern Korean History
Spring. 4 credits. Prerequisite: a course on East Asian history or equivalent. Not offered 2001–2002. J. V. Koschmann.
Designed primarily for graduate students in East Asian Studies who specialize in Chinese and/or Japanese history but need, for comparative or other purposes, to develop a familiarity with the main problems and contours of modern Korean history. Readings are selected primarily from English-language works on Korea from the 1870s through the post–World War II era, including Japanese colonial policy and practice in Korea, the Korean War, and the postwar history of the Republic of Korea.]

HIST 597 Colloquium in Premodern Japanese History
Fall. 4 credits. For advanced undergraduates or graduates. J. Piggott.
This colloquium explores the premodern civilization of Japan from a variety of historical perspectives. Students must attend HIST 297 lectures and participate in a special weekly colloquium.

[HIST 598 Colloquium in Modern Japanese History
Spring. 4 credits. Not offered 2001–2002. J. V. Koschmann.
For graduate students only. Students attend lectures and do the reading for HIST 298, participate in a special weekly colloquium, and write a seminar paper.]

HIST 604 The Colonial Encounter
Fall. 4 credits. S. Greene and T. Loos.
This course examines the way colonizer and colonized influenced the culture, history, and identity of the other. Emphasis is on exploring the colonial encounter as a phenomenon in itself. We consider both sides of the unequal equation that linked specific European countries (for example, France, England, Germany, and the Netherlands) with the states they colonized in Africa and Asia. We discuss how this linkage challenged, at different times and in different places, pre-existing understandings of self, country, culture and notions about the other.

[HIST 609 Modern Japan Studies: The Formation of the Field in History and Literature (also ASIAN 609)
Fall. 4 credits. Not offered 2001–2002.
J. V. Koschmann and N. Sakai.
The course provides both a historical introduction to and critical analysis of the constitution of modern Japan studies as a "field" of postwar academic inquiry. While reading texts particularly influential in the early and contemporary formation of the field, we consider such questions as the domestic and international contexts in which Japanese studies has been institutionalized and maintained, and the relationship between "Japan" as object of area studies discourse, and "Japan" as represented in American journalism, popular culture, and politics. Interdisciplinary and team-taught, the course aims to introduce students to a range of methodologies and approaches developed in historical and critical works, problematizing assumptions in each case. Possibilities for cross-disciplinary research (along lines recently undertaken in areas such as feminist criticism and cultural studies, for example), are also explored.]

HIST 650 Crime and Diaspora in Southeast Asian History
Fall. 4 credits. E. Tagliacozzo.
For description, see HIST 451.

HIST 684 Southeast Asia in the World System: Capitalism and Incorporation, 1500-The Present
Fall. 4 credits. E. Tagliacozzo.
For description, please see HIST 284.

HIST 688 Vietnamese Histories (also HIST 388 and ASIAN 385/685
Fall. 3 credits. K. Taylor.
For description, see ASIAN 385.

HIST 690 Tales of the Heike (also ASIAN 490/690 and HIST 490)
Fall. 4 credits. Limited to 15 students.
J. Piggott.

[HIST 691 Chinese Historiography and Source Materials
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002.
C. Peterson.]

HIST 693 Problems in Modern Chinese History (also HIST 493)
Fall. 4 credits. Prerequisite: HIST 294 or permission of instructor. S. Cochran.
Conflicting interpretations of Chinese history during the late imperial period and the first half of the twentieth century.

HIST 694 Problems in Modern Chinese History (also HIST 499 and ASIAN 499/694)
Spring. 4 credits. Prerequisite: HIST 294 or permission of instructor. S. Cochran.
For description, see HIST 499.

HIST 695 Early Southeast Asia: Graduate Proseminar
4 credits. D. Wyatt.
Introduction to the history of Southeast Asia for graduate students.

HIST 696 Modern Southeast Asia: Graduate Proseminar (also HIST 396 and ASIAN 396/696)
Spring. 4 credits. T. Loos and E. Tagliacozzo.
Introduction to the modern history of Southeast Asia for graduate students. Students are expected to attend the lectures and complete the readings for HIST 396, and they will separately as a group to further explore selected topics.

[HIST 791 Seminar in Medieval Chinese History
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002.
C. A. Peterson.]

[HIST 792 Seminar in Medieval Chinese History
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002.
C. A. Peterson.]

[HIST 795 Seminar in Modern Southeast Asian History
Fall. 4 credits. Permission of the instructor. Not offered 2001–2002.]

[HIST 796 Seminar in Southeast Asian History
Spring. 4 credits. Prerequisite: reading knowledge of relevant languages. Not offered 2001–2002. Staff.]

[HIST 797 Readings in Modern Japanese Thought
Spring. 4 credits. Prerequisite: reading knowledge of Japanese and permission of instructor. Not offered 2001–2002.
J. V. Koschmann.]

[HIST 798 Seminar in Japanese Thought
Fall. 4 credits. Prerequisite: reading knowedge of Japanese and permission of instructor. Not offered 2001–2002.
J. V. Koschmann.]

Near Eastern History

HIST 253 Introduction to Islamic Civilization I (also NES 255, RELST 255) @ # III
Spring. 3 credits. D. Powers.
For description, see NES 255.

[HIST 254 Islamic History: 600–1258 (also NES 257 and RELST 257) @ # (III)
Fall. 3 credits. Not offered 2001–2002.
D. Powers.
For description, see NES 257.]

HIST 288 Imagining the Modern Middle East (also NES 294, JWST 294, GOV'T 358) @ (III)
Fall. 4 credits. S. Alatout.
For description, see NES 294.

HIST 299 Introduction to Christian History (also NES 295, JWST 295, RELST 295) # (III or IV)
Spring. 3 credits. K. Haines-Eitzen.
This course offers an introduction to the history of Christianity from the apostle Paul through the seventeenth century, with an emphasis on the diversity of Christian traditions, beliefs, and practices. We explore the origins of Christianity in the eastern Mediterranean world, the spread of Christianity, the development of ecclesiastical institutions, the rise and establishment of monasticism, and the various controversies that occupied the church throughout its history. This course draws upon primary literary sources (from biblical literature to council proceedings, monastic rules, sermons, theological treatises, and biographies) as well as Christian art, inscriptions, music, and manuscripts.

[HIST 317 Islamic History: The Age of Ibn Khaldun (also NES 356) @ # (III)
Spring. 4 credits. Prerequisite: NES 257 or equivalent. Not offered 2001–2002.
D. Powers.
For description, see NES 356.]

[HIST 372 Law, Society and Culture in the Middle East, 1200–1500 (also HIST 652, NES 351/651, RELST 350) @ # (III)
Fall. 4 credits. Enrollment is limited to 25 students. Not offered 2001–2002.
D. Powers.
For description, see NES 351.]

[HIST 461 Seminar in Islamic History 600–750 (also HIST 671, NES 451 and 650, and RELST 451) @ # (III)
Spring. 4 credits. Enrollment is limited to 25 students. Not offered 2001–2002.
D. Powers.
For description, see NES 451.]

[HIST 652 Introduction to Islamic Law (also HIST 372, NES 351/651, RELST 350)
Fall. 4 credits. Enrollment is limited to 25 students. Not offered 2001–2002.
D. Powers.
For description, see NES 351.]

[HIST 671 Seminar in Islamic History (also HIST 461, NES 451, and 650, and RELST 451)
Spring. 4 credits. Not offered 2001–2002.
D. Powers.
For description, see NES 451.]

Ancient European History

HIST 151 Introduction to Western Civilization # (III)
Summer and fall. 4 credits. R. Graubart.
A survey of European history from Antiquity to the Renaissance and Reformation. Important themes include the influence of ancient culture on medieval society, the development of and conflict between secular and ecclesiastical governments, European encounters with the non-Europeans, the culture and role of minority groups within European society, and the roles of women.

[HIST 228 War and Peace in Greece and Rome # (III)
Fall. 4 credits. No prerequisites. Open to freshmen. Not offered 2001–2002.
B. Strauss.
In ancient Greece and Rome, government did little besides wage war and raise taxes; culture focused on war, warriors gloried in battle, and civilians tried to get out of the way. This course surveys the impact of war and the rarity of peace in the ancient world. Topics include: Why war?; the face of battle; leadership; strategy, operations, and tactics; women and war; intelligence and information gathering; diplomacy and peace-making; militarism; war and slavery; and the archaeology of warfare. Readings in translation include selections from Homer, Herodotus, Thucydides, Xenophon, Caesar, Livy, Tacitus, Josephus, and Ammianus Marcellinus.]

HIST 232 Sophomore Seminar: Eyewitness to War in the Ancient World (also CLASS 234) # (III)
Spring. 4 credits. B. Strauss.
A study of ancient soldier-historians who participated in the campaigns about which they later wrote. Topics include historicity,

autobiography, propaganda, and prose style. Readings include selections from Thucydides, Xenophon, Julius Caesar, Josephus, Ammianus Marcellinus, as well as, for comparative purposes, modern soldier-historians.

HIST 265 Ancient Greece from Homer to Alexander the Great (also CLASS 265) # (III)
Fall. 4 credits. Open to freshmen. Not offered 2001–2002. B. Strauss.
A survey of Greece from the earliest times to the end of the Classical period in the late fourth century B.C. The course focuses on the Greek genius: its causes, its greatness, its defects, and its legacy. The Heroic Age, the city-state, ancient democracy, and the intellectual ferment of the Greek Enlightenment are the main topics of study. Readings in translation from Homer, Aristophanes, Sophocles, Herodotus, Thucydides, Plato, Aristotle, and from the evidence of ancient inscriptions, coins, art, and architecture.

[HIST 268 A History of Rome from Republic to Principate (also CLASS 268) # (III)
Summer and spring. 4 credits. Open to freshmen. Not offered 2001–2002. J. Ginsburg.
A survey of Rome and its empire. This course explores the formation of Rome's Mediterranean empire and its political, social, and economic consequences; the constitutional and social struggles of the late Republic; the transition from Republic to Principate; society and state under the Caesars; the nature and limits of governing a world empire; and the interaction of pagans, Christians, and Jews in the Roman world.]

HIST 435 Modern Classics in the Historiography of Ancient Greece (also CLASS 435) (III)
Fall. 4 credits. Prerequisite: an introductory course in ancient Greek history or civilization or permission of the instructor. B. Strauss.
This upper-level seminar is an introduction to some of the main themes, directions and controversies in modern research on ancient Greece. We read selections from the leading works of scholarship on ancient Greece from the nineteenth and twentieth century, including such authors as Grote, Burckhardt, Cornford, Glotz, Momigliano, M. I. Finley, Ste. Croix, Vernant, Vidal-Naquet, and the current crop of scholars.

[HIST 450 The Peloponnesian War (also HIST 630 and CLASS 450/632) # (III)
Fall. 4 credits. Prerequisites: HIST 265, CLASS 211 or 217, or permission of instructor. Not offered 2001–2002. B. Strauss.
Famous as the subject matter of one of the most important books ever written about war—Thucydides' history—the Peloponnesian War (431–404 B.C.) remains today the focus of study by historians, classicists, and political scientists. This course looks at the results of intensive and ongoing study by ancient historians and considers areas of future research. Topics include strategy, operations, and tactics; battle on land and sea; alliance politics; war and psychology; if the Peloponnesian War was really a historic turning point; war and ethics; Thucydides as a historian; and sources other than Thucydides. Graduate students should enroll in HIST 630.]

[HIST 452 The Tragedy of Classical Athens, 462–404 B.C. # (III)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. B. Strauss.
Course covers the nature of Athenian democracy, society, and culture in the "golden age" of Athens. The course examines the influence of Athenian political life on the great tragedians of the age and the influence of tragedy on the Athenians' conception of their character and history. Readings are from Herodotus, Thucydides, Aeschylus, Sophocles, Euripides, Aristophanes, Plato, Aristotle, and Plutarch.]

[HIST 453 Crisis of the Greek City-State, 415–336 B.C. # (III)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. B. Strauss.
Course covers the fortunes of the city-state and citizen in an age of uncertainty. The focus is on Athens with some attention paid to the wider Greek world. Topics include the nature of Athenian politics, Athenian society, cultural change and war between the city-states, crisis as a historical concept, and anthropology and ancient Greece. Readings in translation include Thucydides, Sophocles, Euripides, Aristophanes, Plato, Aristotle, Demosthenes, and Xenophon.]

[HIST 463 Gender and Politics in the Roman World (also CLASS 463 and WOMNS 464) # (III or IV)
Spring. 4 credits. Prerequisite: HIST 268, CLASS 212, or permission of the instructor. Not offered 2001–2002. J. Ginsburg.
This course examines the relationship between gender and politics in the late Roman Republic and early Empire. Among the questions we address are: Was politics the exclusive domain of men in Roman society (as is generally assumed)? Does a broader definition of politics, and an understanding of the various forms political activity in ancient Rome might take, allow a place for women in Roman political life? What role does gender have in Roman political discourse and ideology? Why do issues such as family, marriage, and sexuality become subjects of political debate and legislation?]

[HIST 469 Equality and Inequality in Ancient Greece (also CLASS 469) # (III or IV)
Fall. 4 credits. Prerequisite: HIST 265, CLASS 211 or 217, or written permission of the instructor. Not offered 2001–2002; next offered 2002–2003. B. Strauss.
We examine equality and inequality in Archaic and Classical Greek city-states ca. 650–400 B.C., with an eye toward politics, society and economics, culture, and gender relations. The course focuses on concepts and institutions such as ancient democracy, tyranny, oligarchy, "middling" ideology, and slavery, as well as theories of equality. All readings in English.]

HIST 473 Roman Society and Politics under the Julio-Claudians (also CLASS 480) # (III or IV)
Spring. 4 credits. Prerequisite: CLASS 212, HIST 268, or permission of instructor. J. Ginsburg.
For description, see CLASS 480.

[HIST 630 Topics in Ancient History (also CLASS 632)
Fall. 4 credits. Not offered 2001–2002. B. Strauss.]

Medieval, Renaissance, and Early Modern European History

HIST 151 Introduction to Western Civilization # (III)
Fall and summer. 4 credits. K. Graubart.
For description, see Ancient European History.

HIST 152 Introduction to Western Civilization # (III)
Summer and spring. 4 credits. R. Weil and P. Holquist.
For description, see Modern European History.

[HIST 204 Seminar: Age of Atlantic Revolution # (III)
Fall. 4 credits. Seminar designed for underclassmen but open to all students. Enrollment limited to 15 students. Prerequisite: permission of instructor. Not offered 2001–2002. R. Weil.
"All the Atlantic Mountains shook," wrote the poet William Blake of the revolutions which toppled regimes across Europe and the Americas at the end of the eighteenth century. This course explores the ideas, outcomes, and connections among events in America, France, Haiti, and Britain, through literary and philosophical texts: Wordsworth, Rousseau, Jefferson, Paine, Burke, Godwin, Tocqueville, and even Jane Austen.]

[HIST 211 Specters, Demons, and the Dead in European Society, 1200–1800 # (III)
Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. S. Pohl.
Premodern Europeans believed that they could interact with supernatural apparitions in a variety of ways. The dead could return to admonish the living, demons might possess men and women, houses could be haunted by specters and poltergeists. What can we learn from a study of these beliefs about the ways in which Europeans regarded sin, punishment, the afterlife, and the role of the devil in their lives? What was the impact of the Reformation or the scientific revolution on these beliefs?]

[HIST 234 Seminar: Gender in Early Modern Europe (also WOMNS 234) # (III)
Spring. 4 credits. Seminar designed for underclassmen but open to all students. Enrollment limited to 15 students. Prerequisite: permission of instructor. Not offered 2001–2002; next offered 2002–2003. R. Weil.
Course serves as an inquiry into how masculinity and femininity were defined in early modern Europe. Questions to be explored include: What purpose did gender distinctions serve in this particular society? To what extent were men and women able to shape and redefine the meaning of their gender? How was their ability to do so affected by such events as the Reformation and the French Revolution?]

[HIST 257 English History from Anglo-Saxon Times to 1485 # (III)
Fall. 4 credits. Not offered 2001–2002; next offered 2002–2003. P. Hyams.
A survey of the government, social organization, and cultural and religious experience of the English people. Particular stress is laid on land settlement, the unification of the realm, the emergence of state institutions such as Parliament, and changes in economic organization (manors, towns, and commerce). The approach is comparative within a context

of contemporary European developments. The course offers students who wish to work on their writing skills an opportunity to do so, especially in the second paper.]

[HIST 259 The Crusades # @ (III)
Fall. 4 credits. Not offered 2001–2002. P. Hyams.
A lecture course examining the Crusading Movement and the States it produced from the eleventh century to the fall of the mainland Kingdom of Jerusalem in 1292. The historical themes this generates are almost unlimited. The course treats the Christianity and Chivalry of the Medieval West, the confrontation of this culture with those of the Mediterranean and Islam, and what is perhaps the cradle of Western Colonialism. The very concept of "Crusade" itself is problematic today and will continue to cast its shadow on U.S. dealings with the Middle East. The readings allow students to choose from a very wide range of paper topics, and enjoy an excellent introduction to every aspect of the long-gone world of the Middle Ages.]

HIST 262 The Middle Ages: Introduction and Sampler (also RELST 265) # (III)
Spring. 4 credits. P. Hyams.
As a single-semester introduction to the period, this survey aims to convey what was significant in that area of the "West" that was to become Europe, between the end of the Roman Empire in the West and the Renaissance, from 395 to 1400. It takes a critical look at a formative period of Western Civilization. The course is organized into modules, the first of which surveys in five weeks the main public developments in Political and Church History over the period. Other modules focus in some depth on select aspects, such as technology, music, material resources, and religions, to other choice samples from the best of medieval culture. Emphasis is on students finding their own ways to win credit.

HIST 263 The Earlier Middle Ages (also RELST 263) # (III)
Fall. 4 credits. J. J. John.
A survey of medieval civilization from ca. 300 to ca. 1100 dealing with religious, intellectual, political, and economic developments in Western Europe.

[HIST 264 The High Middle Ages # (III)
Fall. 4 credits. Not offered 2001–2002. P. Hyams.
A survey of medieval civilization 1100–1400, dealing with political, economic, religious, and intellectual developments in Western Europe. Special attention is paid to the interaction of different kinds of history and to the historian's understanding of literature and its use as a primary source. Lectures and class discussions.]

[HIST 275 Authority and Resistance in Europe, 1400–1600 # (III)
Spring. 4 credits. Not offered 2001–2002. S. Pohl.
A lecture course examining the political, cultural, and social transformations during the Reformation era through an exploration of aspects of state formation and ecclesiastical order, social and religious protest, and deviant behavior. Specific topics covered include the Protestant Reformations and the emergence of confessional churches, law and crime, the peasant rebellions and the early modern witch hunts.]

[HIST 305 Britain, 1660–1815 # (III)
Fall. 4 credits. Not offered 2001–2002. R. Weil.
Course covers the British Isles from the Restoration of Charles II through the Napoleonic wars. We consider the domestic effects of war and Empire; luxury, commerce, and the public sphere; continuing conflicts over religious toleration, popular politics, and the relation of England to Ireland and Scotland. Readings include works by John Locke, Jonathan Swift, Adam Smith, Thomas Paine, Edmund Burke, and Jane Austen.]

HIST 310 Life, Literature, and Power in Medieval England (also ENGL 314) # (III or IV)
Fall. 4 credits. No prerequisites. P. Hyams and A. Galloway.
This course explores key issues and key texts from the English literature of the period 1100–1500. It aims to survey and introduce the Age of Middle English—its history, its language, and its literature—to majors in English and History and others who seek something more than a bare acquaintance with the *Canterbury Tales* and Wars of the Roses. The instructors, coming from two different disciplines, expect to educate themselves as well as the class on the contributions that history and literature can each make to the understanding of the other. Lectures are designed to provide context for the class's central feature: close reading of texts, some in the original Middle English, some in translation of Middle English, French, and Latin, ranging from literary masterpieces to chronicle narratives, from dream visions to social satire.

HIST 349 Early Modern England # (III)
Fall. 4 credits. R. Weil.
This course explores the crises of political, religious, and epistemological authority that plagued England in the sixteenth and seventeenth centuries. We examine the political and cultural impact of the Protestant Reformation, the nature of Tudor despotism and Stuart absolutism, the construction of a rhetoric of political dissent around issues of sexuality and corruption, competing understandings of the social order and social control, the Puritan Revolution, and the invention of liberalism. Emphasis is on close reading of contemporary sources, from autobiography and drama to political theory.

[HIST 350 The Italian Renaissance (also ITALL 221) # (III or IV)
Spring. 4 credits. Not offered 2001–2002. J. Najemy.
An exploration of intellectual, cultural, religious, and political developments in Italy from the political thought of Dante and Marsilius in the age of the communes, through the several stages of Humanism from Petrarch to Alberti to Pico, down to the crisis of Italian liberty in the generation of Machiavelli, Guicciardini, and Castiglione. The course seeks to problematize the notion of a "Renaissance" in the period's ambivalent attitudes toward history, politics, learning, culture, gender, language, and the role of intellectuals in politics and society. Emphasis is placed on the close reading of primary sources and on issues of interpretation.]

HIST 351 Machiavelli (also ITALL 351) # (III or IV)
Fall. 4 credits. J. Najemy.
This course presents Machiavelli in a variety of historical and interpretive contexts: European and Italian politics in the early sixteenth century; the decline of the Florentine republic and the rise of the Medicean principate; Machiavelli's own career in government and his, and the republic's, crisis in 1512–13; the intellectual traditions of Renaissance humanism, political thought, and the revival of antiquity; vernacular literary currents and popular culture; and the political figures, writers, and theorists with whom Machiavelli associated and corresponded. Emphasis is placed on a close reading of the major works (including the letters, *The Prince*, the *Discourses*, *Mandragola*, and selections from *The Art of War* and the *Florentine Histories*, all in translation) and a critical examination, in the light of that reading, of some major modern interpretations of Machiavelli.

[HIST 364 The Culture of the Renaissance II (also COM L 362, ENGL 325, RELST 362, MUSIC 390) # (III or IV)
Spring. 4 credits. Open to freshmen with permission. Not offered 2001–2002. C. Kaske, W. Kennedy.
For description, see COM L 362.]

[HIST 365 Medieval Culture, 400–1150 (also RELST 365) # (III)
Fall. 4 credits. Prerequisite: HIST 263 or permission of instructor. Not offered 2001–2002. J. J. John.
Intellectual and cultural developments in the age of monasticism, from St. Augustine and St. Benedict to St. Anselm and St. Bernard of Clairvaux.]

[HIST 366 Medieval Culture, 1100–1300 (also RELST 366) # (III)
Fall. 4 credits. Prerequisite: HIST 264 or permission of instructor. Not offered 2001–2002. J. J. John.
The origin and development of the universities is studied as background for a consideration of the scholastic mentality and its influence on the art, literature, philosophy, science, script, and theology of the period. Readings from Abelard, Hugh of St. Victor, Bonaventure, Thomas Aquinas, Dante, and others.]

[HIST 368 Marriage and Sexuality in Medieval Europe (also RELST 368, WOMNS 368) # (III)
Spring. 4 credits. No formal prerequisite, though some prior knowledge of medieval European history is desirable. Not offered 2001–2002; next offered 2002–2003. P. Hyams.
Few topics generate heat so readily as gender relations and sexuality. Behind the current controversies lie decisions made in the first Christian centuries, and firmed up in the course of the Middle Ages; these still affect all of us, believers and unbelievers alike. This course studies Western attempts to deal with the problem of sexuality up to about 1500. The class first clarifies the church's normative rules of law and theology. Armed with this framework, we then turn to more specific topics, including homosexuality, prostitution, rape/abduction, and sexuality in medieval literature. The goal is to be able to compare the ideal model with the reality, and thus to assess the product the medieval church passed on to Western culture and to ourselves.]

HIST 369 The History of Florence in the Time of the Republic, 1250–1530 (also ITALL 369) # (III or IV)
Spring. 4 credits. J. Najemy.

Florentine politics and society from the communal period through the age of Dante, the rise and decline of the guild republic, the age of civic humanism, and the rise of the Medici, to the crisis of the republic in the time of Machiavelli. Social classes and conflicts, the elite families, economic structures, the working classes, guilds, family history, women, and political and historical ideas are considered in the context of the emergence and transformation of republican government.

HIST 404 The Soul in Medieval Culture (also S HUM 401) (III)

Fall. 4 credits. R. Ziomkowski.

This course covers the medieval reception of mythological themes in Plato's philosophy, particularly the world-soul and the transmigration of souls, as these appear in the *Timaeus* (the only dialogue of Plato known in the Latin West throughout the Middle Ages). In focusing on the nature of the soul, we study the tension between the theology and philosophy concerning a doctrine of central importance to medieval Christian culture, as well as one that the ancient world had developed to a high degree of sophistication. We look at texts written during the first thirteen centuries of the Christian era, with particular emphasis on the twelfth century. The course is conducted as intellectual history, inasmuch as we study the reception of Plato's *Timaeus* across time and across a range of literary genres (dialogues, theological treatises, cosmological compendia, poetry), with particular attention to works of Menippean satire such as Boethius' *Consolation of Philosophy*, Bernardus Silvestris' *Cosmographia*, and Alan of Lille's *Plaint of Nature*. Theoretical perspectives are drawn from works of literary criticism, particularly from Mikhail Bakhtin's theories of Menippean satire. All texts are read in translation, although the ability to read Latin can broaden students' research options.

[HIST 408 Feudalism and Chivalry: Secular Culture in Medieval France, 1000–1300 # (III)

Fall. 4 credits. No prerequisites; HIST 262, 263 or 264 suggested. Not offered 2001–2002. P. Hyams.

An upper-level seminar on the main currents of noble lay culture in France, which led European fashions in love, warfare, entertainment, and environment through most of the period. There is heavy emphasis on contemporary sources (in English), including lively and complete readings from epic literature (the Song of Roland), lives, and chronicles.]

[HIST 409 Seminar on Work in Europe and America # (III)

Fall. 4 credits. Not offered 2001–2002. S. Kaplan.

For description, see Comparative History.]

[HIST 427 Power and Society in Early Medieval Europe and Japan @ # (III)

Spring. 4 credits. Prerequisite: a course in medieval European or Japanese historical studies, or permission of instructor. Not offered 2001–2002. P. Hyams and J. Piggott.

This seminar focuses on structures, processes, and practices of society in early medieval Europe and Japan. It provides a forum for discussion of the ways in which, in some very different societies, Europeans and Japanese handled power. We are also interested in comparing historiographical methodologies employed and issues considered by historians of these societies.]

[HIST 436 Conflict Resolution in Medieval Europe # (III)

Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. P. Hyams.

This seminar concentrates on a time (late ninth to thirteenth centuries) when much of Europe lacked formal systems of justice, and so handled questions of social control quite largely by extra-legal means. Its subject is in one sense political history upside-down, as viewed by individuals rather than their rulers. We examine ways in which anthropology and some recent approaches to law can assist: the readings are partly anthropology, partly translated medieval accounts of actual conflicts, with samples of recent interpretation. The topics covered should be of interest to law students and majors in anthropology and other modern social sciences.]

[HIST 444 Seminar: Witchcraft, Magic, and the Occult in Europe, 1400–1700 # (III)

Spring. 4 credits. Enrollment limited to 15 students. Prerequisite: permission of instructor. Not offered 2001–2002. S. Pohl.

A study of attitudes toward magic, witchcraft, astrology, specters, and demons in late medieval and early modern Europe and what they reveal to us about religious beliefs, concepts of community, and gender relations. Special attention is given to the role the Christian Church claimed in defining the occult: which aspects it legitimated and which it condemned. Other topics include the influence of humanism, the Reformation, and the Scientific Revolution on attitudes toward the occult. We also undertake an analysis of the historiographical model which opposes "elite" to "popular" ideas. The course emphasizes close analyses of primary works, including literary and visual sources.]

[HIST 446 Law, Crime and Society in Europe, 1400–1700 # (III)

Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002; next offered 2002–2003. S. Pohl.

This comparative study focuses on Germany, England, France, and Italy and concentrates mainly on the social and legal treatment of crimes of violence. Throughout the course, we consider the differences and similarities between English common law and continental legal systems. Major issues covered include the role of criminal justice, the fate of customary methods of conflict resolution in a time of increasing legal centralization, and the relationship between cultural and legal change. We approach these issues by examining, among other things, the development of criminal procedure, the role of lawyers, contested notions of criminal responsibility, and the self-presentation of defendants. The course emphasizes close readings of primary works, including trial documents and literary sources.]

HIST 447 Crusaders and Chroniclers # @ (III)

Fall. 4 credits. P. Hyams.

An intensive reading seminar offering a natural progression from HIST 259 The Crusades. It examines contemporary accounts of the crusading movement in English translation. The twin goals are to follow select themes of crusading history to a deeper level than is possible in HIST 259 and to study medieval historiography through whole chronicles and other primary sources.

[HIST 464 Murder, Warfare, and the State: Violence in Europe, 1300–1800 # (III)

Fall. 4 credits. Permission of instructor. Not offered 2001–2002. S. Pohl.

An inquiry into forms of and attitudes toward violence in late medieval and early modern Europe. Questions to be explored include: How violent was premodern Europe compared to modern Europe? How did the various cultural legitimations of violence change over time? We examine these questions by analyzing forms of interpersonal violence as well as violence orchestrated by the state, such as warfare and capital punishment.]

HIST 468 Love and Sex in the Italian Renaissance (also ITALL 468) # (III or IV)

Spring. 4 credits. J. Najemy.

An exploration of the representation of love, sex, and eros in Italian Renaissance literature and the attempts by secular governments and the Church to manage, discipline, and punish sexual transgression. Primary texts include Boccaccio's *Decameron*, fifteenth-century *novelle*, plays by Machiavelli (*Mandragola*, *Clizia*) and Bibbiena (*Calandria*), and Aretino's *Dialogues*. Secondary readings include studies of sexual crime, love across social boundaries, prostitution, homosexuality, and lesbianism.

HIST 471 Knowledge and Politics in Seventeenth Century England (also S&TS 473) # (III)

Spring. 4 credits. Limited to 15 students. P. Dear and R. Weil.

England in the 17th century was a revolutionary ferment of political, religious, and philosophical conflict. This course examines the conflicts and arguments, and the means explored for their apparent resolution. These affected ideas of God and worship, the meanings of gender, conceptions of the natural world and its scientific appropriation, and the legitimacy and proper form of political power. The course focuses on the close study of primary source readings by many of the principal players in all these areas, including Francis Bacon, Thomas Hobbes, the Duchess of Newcastle, and John Locke.

[HIST 472 Politics and Culture in Eighteenth-Century England # (III)

Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. R. Weil.

Between 1660 and 1800 England experienced imperial and economic expansion, the Enlightenment, and the threat of Revolution abroad and at home. How in this context did people interpret and imagine the nature of the social order, political authority, and the family? We consider the changing and fiercely contested notions of property, politeness, crime and punishment, sexuality, Empire, slavery, and the market.]

[HIST 479 Patronage and the Medici # (III)

Spring. 4 credits. Not offered 2001–2002. J. Najemy.

Between the early fifteenth and sixteenth centuries, the Medici family of Florence rose from the ranks of the city's merchant bankers to become virtual rulers of the republic, cardinals and popes in Rome, and eventually hereditary grand dukes of Tuscany. Much of the family's power and fame derived from two kinds of patronage: the social and political

patronage that established their political influence; and the artistic and cultural patronage central to the fashioning of their image and the realization of their princely ambitions. This seminar explores the connections between the two kinds of patronage with a focus on works of art and architecture and recent historical and art historical scholarship.

[HIST 481 The English Revolution # (III)
Fall. 4 credits. Not offered 2001–2002. R. Weil.
Between 1640 and 1660, England experienced two decades of civil war and revolution and embarked on a fascinating series of attempts to reorganize political and religious life. Women and the lower classes emerged as actors on the political stage, radical religious sects flourished, and the nature of authority was questioned in both the family and the state. This course explores the political, cultural, religious, and social dimensions of the English Revolution, using mostly primary sources.]

[HIST 496 Theorizing the Public Sphere (also COM L 496 and GERST 496) (III or IV)
Fall. 4 credits. Not offered 2001–2002. P. Hohendahl.
For description, see GERST 496.]

HIST 651 Old English Literature in Its Historical Context (also ENGL 710) #
Spring. 4 credits. P. Hyams, T. D. Hill.
This graduate course, cross-listed with ENGL 710, might equally be known as "Anglo-Saxon England: History and Literary Context." It studies the written sources for major questions of Anglo-Saxon history in their literary and cultural context. It concentrates on important texts extant in both Latin and Old English. Comparison can illuminate the resources and intentions of writers, compilers, and copyists, the literary and linguistic culture of England, and the ways in which historians might most fruitfully study such texts. Bede's *Ecclesiastical History* and *Battle of Maldon,* Aelfric's *Collequies*, selections from the Anglo-Saxon chronicle, *Beowulf*, laws, homilies, and wisdom literature are all likely to come under scrutiny. One goal is to reclaim for European religious history a corpus of material that historians neglect because it is in Old English.

[HIST 653 England—Britain—Europe in the Middle Ages #
Spring. 4 credits. Not offered 2001–2002. P. Hyams.
This graduate seminar tentatively explores the coming move from the study of medieval English history to that of the British Isles and its inhabitants within the wider context of Europe and Western Christendom. Readings are mostly representative original sources. The precise texts and topics studied depend on the interests (and especially future teaching plans) of participants, but certainly allow for a critical examination of existing literature on the general and cultural history of England, Scotland, Ireland, and Wales.]

HIST 663 Graduate Seminar in Renaissance History
Fall. 4 credits. J. Najemy.
Topic for 2001: The Medicean principate.

[HIST 664–665 Seminar in Latin Paleography
664, fall; 665, spring. 4 credits each term. Hours TBA. Not offered 2001–2002. J. J. John.]

[HIST 666 Seminar in Medieval History
Fall. 4 credits. Not offered 2001–2002. J. J. John.]

[HIST 669 Politics, Power, and Culture in Early Modern England
Fall. 4 credits. Not offered 2001–2002. R. Weil.
An inquiry into how the ruling class ruled, and what that meant to and for everyone else. Topics include: the invention of the "state", the relationship of central and local power; clientage and corruption; the construction of categories of "public" and "private;" representations of monarchy, hegemony, and resistance; court culture, and the social interpretations of the English Revolution and their critics. Focus is on historiography and methodology, with some engagement with primary sources.]

Modern European History

HIST 152 Introduction to Western Civilization (1600 to the End of World War II) # III
Spring. 4 credits. P. Holquist and R. Weil.
This course offers a comparative perspective on the development of modern states, societies, and cultures in Europe and North America. Topics include: religious and scientific revolutions in early modern Europe: European expansion and conquest; Enlightenment and revolution; liberalism, capitalism, and communism; the politics of race, slavery, and the new imperialism; the World Wars and the Holocaust; the Cold War; and the modern and the post-modern in European and American culture.

HIST 215 Balkan Cultures and History # (III)
Spring. 4 credits. J. Weiss and W. Browne.
Cultural and linguistic factors interacted with political events to form present-day Slovenia, Croatia, Bosnia-Herzegovina, Serbia, Montenegro, Romania, Bulgaria, Macedonia, Albania, and Greece. The course traces these relationships from the end of the medieval period to the present.

[HIST 220 The French Experience: An Introduction (also FRLIT 224) (III or IV)
Fall. 3 credits. Not offered 2001–2002; next offered 2002–2003. S. Kaplan and M. Greenberg.
An examination of French society, culture, and institutions. What has made French culture so distinctive? Its literature and its revolutions, its gastronomy and fashion, its painting, cathedrals, and cinemas? Looking attentively at texts, images, and contexts from selected moments in the seventeenth, eighteenth, nineteenth, and twentieth centuries, we attempt to unravel some of the defining enigmas of the French experience. Two lectures/week in English and one section (one section conducted in English, one in French). Readings available both in French and English translation.]

HIST 235 Antisemitism and Crisis Modernity (also JWST 254) (III)
Spring. 4 credits. V. Caron.
This course examines the role of antisemitism in nineteenth and twentieth century European ideological, political, and socioeconomic developments. Attention is paid to the way in which antisemitism illuminates the underside of European history, allowing us to see how anti-Jewish intolerance and prejudice became embedded in the worldviews of significant sectors of the European populations, culminating in the Holocaust. Topics include: the Christian roots of antisemitism and the extent to which modern antisemitism marks a break with the medieval past; the politicization of antisemitism by both Left and Right; the role of antisemitism in socioeconomic conflicts linked to the rise of capitalism; Jewish responses to antisemitism; antisemitism in the Nazi and Fascist revolutions; and contemporary interpretations of antisemitism.

[HIST 267 History of Zionism and the Birth of Israel (also JWST 290, NES 290) @ (III)
Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. V. Caron.
This course examines the history of Zionism as an ideology and political movement from its origins in the nineteenth century to the present. Attention is paid to situating Zionism within the context of modern Jewish, European, and Middle Eastern History. Topics include: the ideological foundations of Zionism; the role of Theodor Herzl and the rise of political Zionism; the Balfour Declaration; the development of the Yishuv; Zionism as a cultural identity for Diaspora Jewry; the British mandate; the Arab-Zionist encounter; Zionist responses to the Holocaust; and Zionism and contemporary Israeli society.]

[HIST 283 Europe in the Technological Age (III)
Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. J. Weiss.
An introduction to politics, culture, and technology in contemporary Europe. In the sections on politics a survey of party systems and their interactions with social movements is followed by examinations of post-Communist constitution and political structures, the New Germany, and the European Union. The section on European culture pays special attention to the European press and electronic media as shapers and reflectors of cultural values. A section on the struggle over the control of the past deals with tensions and conflicts in European national memories. In the section on Nationalism and ethnicity, political and cultural approaches are combined in consideration of the wars in former Yugoslavia as well as less violent conflicts between nationalists and members of ethnic minorities elsewhere in Europe. The section on technology deals with the design of products and processes as a cultural phenomenon, making cross-national comparisons of some of the social, cultural, and institutional influences on engineering performance.]

[HIST 285 From Medievalism to Modernity: The History of Jews in Early Modern Europe, 1492–1789 (also NES 245, JWST 253) # (III)
Fall. 4 credits. Not offered 2001–2002; next offered 2002–2003. V. Caron.
This course examines the history of European Jewry during the centuries of transition from the Middle Ages to the Modern Era. We examine the extent to which traditional Jewish life began to break down during this period and thus paved the way for the emergence of modern Jewry. Topics include the impact of

the Spanish Expulsion of 1492; religious, intellectual, and socioeconomic dimensions of the Marrano dispersion, including Lurianic Kabbalah and the messianic movement of Shabbetai Zevi; the establishment of Jewish communities in the West; the end of the "Golden Age" of Polish Jewry and the rise of Hasidism; the changing economic and political role of Jews in the seventeenth and eighteenth centuries; and the impact of the Enlightenment.]

HIST 290 Twentieth-Century Russia and the Soviet Union (III)
Fall. 4 credits. P. Holquist.
An introductory lecture course spanning the lifetime of the USSR (1917–1991), but covering the last years of the Russian Empire and the first years of the post-communist present as well. Geographically, it focuses on the Russian heartland and the non-Russian areas of the Soviet Union. The course explores the roots and consequences of the Russian Revolution; the nature and evolution of Leninism, Stalinism, and Soviet communism; the entrenchment of reform of the post-Stalinist system; and the legacy of communism for the region's new regimes. Students are introduced to a wide variety of historical materials, including documents, essays, memoirs, literature, and film.

HIST 291 Modern European Jewish History, 1789–1948 (also JWST 252) (III)
Fall. 4 credits. V. Caron.
Jewish life in Europe experienced a profound transformation as a result of the process of Jewish emancipation which began at the end of the eighteenth century. While emancipation offered Jews unprecedented social, economic, and political opportunities, it also posed serious challenges to traditional Jewish life and values by making available new avenues of integration. This course examines the ways in which Jewish and non-Jewish society responded to these new developments from the eighteenth century Enlightenment to the post-World War II era. Topics include Jewish responses to emancipation, including assimilation and new varieties of religious accommodation; the development of modern antisemitism; the rise of Zionism and the creation of the state of Israel; the modernization of Eastern European Jewry; the impact of mass immigration; and the Nazi era.

HIST 355 The Old Regime: France in the Seventeenth and Eighteenth Centuries # (III)
Fall. 4 credits. S. Kaplan.
A systematic examination of the social structure, economic life, political organization, and collective mentalities of a society that eclipsed all others in its time and then, brutally and irreversibly, began to age. France, in European perspective, from the wars of religion through the age of Voltaire.

[HIST 356 The Era of the French Revolution and Napoleon # (III)
Spring. 4 credits. Not offered 2001–2002. S. Kaplan.
A study of the failure of the traditional system, its dismantling and replacement in France, and the international consequences. Focus is on the meaning of the revolutionary experience, the tension between the desires to destroy and to create, and the implications of the Revolution for the modern world.]

[HIST 357 Survey of German History, 1648–1890 # (III)
Fall. 4 credits. Open to freshmen with permission of instructor. Not offered 2001–2002; next offered fall 2002. I. Hull.
An examination of the social, political, intellectual, and diplomatic history of the German states from the devastation of the Thirty Years' War, through absolutism, the bourgeois revolutions of 1848, the struggle for unification, to the beginning of the modern industrial state.]

[HIST 358 Survey of German History, 1890 to the Present (III)
Spring. 4 credits. Open to freshmen with permission of instructor. Not offered 2001–2002; next offered spring 2003. I. Hull.
An examination of the "German problem," that is the political, cultural, economic, and other causes of modern Germany's extreme violence and volatility from 1890 through 1945, and of the consequences thereof on the divided Germany of 1945 to 1989 and on the new German state since 1989.]

[HIST 362 European Cultural History, 1750–1870 (also COM L 352) # (III or IV)
Fall. 4 credits. Not offered 2001–2002. M. Steinberg.
The course focuses on the making of middle-class culture, society, and imagination from the Enlightenment through the French Second Empire. There are three units with national and thematic foci: Germany in the period of Enlightenment, emancipation, and the burgeoning of national consciousness; questions of law, property, gender, and sexuality in early nineteenth-century England; modernism and urbanism in Second Empire France. Primary readings (including novels, paintings, and operas) are considered along with contemporary historical and theoretical readings.]

HIST 363 European Cultural History, 1870–1945 (also COM L 353) (III or IV)
Spring. 4 credits. M. Steinberg.
This course focuses on problems of modernity, identity, and ideology in comparative European contexts. We address the politics and culture of German nationalism, French urbanism and religious revival, the cultural origins of psychoanalysis, technological culture (including film), and the cultural origins and dynamics of fascism. As in 362, primary materials (including Wagner, Nietzsche, George Eliot, Freud, Benjamin, and Alfred Hitchcock) are considered along with recent theoretical work.

[HIST 370 History of the Holocaust (also JWST 353) (III)
Spring. 4 credits. Each student must enroll in a section. Not offered 2001–2002; next offered 2002–2003. V. Caron.
This course analyzes the meaning of the Holocaust from three vantage points: European history; Jewish history; and that of those states and religious institutions that shared responsibility by having stood by in silence. Topics include: the evolution of modern anti-Semitism; the role of anti-Semitism in the Nazi ideology and program; the bureaucratization of death; Jewish life in ghettos and concentration camps; the fate of Jews in occupied Europe and the question collaboration; Jewish political behavior under duress; the responses of the Western allies and the Churches; and contemporary interpretations of the Holocaust and the meaning of evil.]

HIST 371 World War II in Europe (III)
Fall. 4 credits. J. Weiss.
The Second World War remains the single most important set of events shaping the contemporary world. The course deals with both the events of World War II as they shaped European and world history and the way those events were remembered and commemorated in postwar years. Lectures, screenings, and readings examine: the role of wartime political leaders and military commanders; the experience of war and occupation for soldiers and civilians, including Resistance movements and collaborators; Nazi genocide; intellectual and cultural changes during the war, including the impact on literature and philosophy; strategic questions about the origins and conduct of the war; the concluding phases involving the Nuremberg Trials, the Yalta and Potsdam conferences, and the launching of the Cold War; and the representation of the war in subsequent films, literature, and political culture.

[HIST 379 The First World War: Causes, Conduct, Consequences (III)
Fall. 4 credits. Open to freshmen with permission of instructor. Not offered 2001–2002. P. Holquist and I. Hull.
This course examines the long-term and immediate political, social, and cultural causes of World War I, its catastrophic prosecution, and its revolutionary consequences. Recurring themes are: the building of nation-states, the diplomatic and military systems of the nineteenth and twentieth centuries, mass mobilization, the development of mass violence, and the emergence of millenarian visions of the future.]

[HIST 380 Social History of Western Technology # (III)
Spring. 4 credits. Not offered 2001–2002. J. Weiss.
For description, see History of Science.]

HIST 383 Europe, 1900–1945 (III)
Spring. 4 credits. J. Weiss.
An investigation of the major developments in European politics between 1900 and the end of the Second World War. Emphasis is on the rise and fall of democratic political systems and their alternatives. Topics include the reorientation of liberalism and socialism, the transforming effects of war and depression, the dynamics and diplomacy of fascism, the European response to the economic and ideological influence of America and the Soviet Union, the changes in Eastern Europe during the interwar years, and the interaction between politics and social structure.

[HIST 384 Europe, 1945–1968 (III)
Fall. 4 credits. Not offered 2001–2002. J. Weiss.
A political and social history of Europe between the fall of fascism and the political crises of 1968. Emphasis is on the comparative study of the elaboration of democratic institutions and ideologies. Topics include the origins and course of the Cold War in Western and Eastern Europe, Gaullism and Christian Democracy, the emergence of welfare states, liberal-democratic and Communist culture, the end of colonial empires in the West, opposition movements in Eastern Europe, and the general upheaval of 1968.]

[HIST 385 Europe in the Twentieth Century: 1968–1990 (III)
Spring. 4 credits. Not offered 2001–2002. J. Weiss.
The major political developments in Europe between the upheavals of 1968 and the collapse of Communist regimes. Topics include the effects of economic turndown in 1973–1974; the response to terrorism; regionalist movements; new ethnic minorities and their opponents; Socialist governments in southern Europe; the arrival of democracy in Spain, Portugal, and Greece; new dynamics in the European Community; the rise of Thatcherism; the war scare of the 1980s; and the final phase of the Cold War.]

HIST 405 Jewish Culture and Modernity (also SOC HUM 408, JWST 408, GERST 420) (III or IV)
Fall. 4 credits. Limited to 15 students. M. Steinberg.
With emphasis on Germany but with materials drawn also from England, France, and the United States, this seminar will analyze the intersections and mutual production of modern Jewish culture and general structures and discourses of modernity. It takes up the category of "Jewish culture" as distinct from "Judaism." The focus is less on a religious tradition than on a cultural and historical identification whose sacred/secular boundaries are fluid and contestable. Thus, the boundaries between sacred and secular become a central debate both within Jewish culture and its multiple, mutual refractions with the non-Jewish world, which may itself be constituted in terms of modern nationalities, as Christian, secular, or anti-Semitic.

[HIST 406 The People in the French Revolution # (III)
Fall. 4 credits. Not offered 2001–2002. S. Kaplan.
The French Revolution was nothing if not a mass event. Mass action played a critical part in shaping its course. The "re-invention" of France affected the population down to each village and demanded decisions from virtually every adult. This course focuses on the people as actors: their collective memory, their ideologies, their repertoire of intervention, the formation of a popular political culture. It examines the encounters between the people (in their multiple incarnations) and the revolutionary elites who sought to articulate and appropriate the Revolution. A major theme is the tension between the ambitions to achieve liberty and equality.]

[HIST 409 Seminar on Work in Europe and America # (III)
Fall. 4 credits. Not offered 2001–2002. S. L. Kaplan.
For description, see Comparative History.]

HIST 410 Russia in the Age of Revolution and Total War (III)
Spring. 4 credits. P. Holquist.
This seminar examines the years of 1905–1945, a period of unparalleled violence and transformation in Russian history, encompassing several revolutions, two world wars and one civil war. Out of Russia's "second time of troubles" (1905–1921), a Soviet state emerged propagating an alternative model for politics and society, a model of society that would be explicitly challenged in the cataclysmic confrontation between the Soviet Union and Nazi Germany. This course examines the links between revolution, total war, and the emergence of the welfare state in Russia and situate the revolutionary Soviet experience in its European and global context. Students read both historical treatments and analyze documents in translation. Knowledge of foreign languages is not required but some background in European history is desirable.

HIST 413 Gender and the Law in German Culture (also GERST 416) (III or IV)
Spring. 4 credits. T. Matysik.
This course examines the cultural space of law in modern German history. It pays particular attention to law and legal reform in relation to gendered notions of citizenry, subjectivity, and sexuality. The course takes as its hypothesis the idea that the prevalence in modern German thought of the concern with the "law" as the moral regulation of normative behavior is closely connected to the transformation of actual laws and legal codes in German history. In order to assess the terrain between such actual laws and their cultural effects, we examine a combination of literary, social-theoretical, and historiographical readings that address the problem of law. In this way we acquire, first, a general overview of German legal history together with a language with which to speak about a variety of legal theoretical traditions. We also explore perceptions of, responses to, and critiques of the historical role of law in German culture.

HIST 417 History of Jews in Modern France (also JWST 446, FRLIT 413) (III or IV)
Fall. 4 credits. Prerequisite: permission of instructor. V. Caron.
This course explores the integration of Jews into French society from the French Revolution to the present. Topics include: the debate over Jewish emancipation during the Enlightenment, the French Revolution, and the Napoleonic era; the processes of religious and social assimilation; the rise of anti-Semitism and the Dreyfus Affair; Jewish responses to anti-Semitism; the immigrant challenge and refugee crisis of the 1930s; the Vichy era and Jewish resistance during World War II; and the reconstruction of the French Jewish community since 1945.

[HIST 435 Collective Action and Politics in Modern Europe (III)
Not offered 2001–2002. S. Kaplan, S. Tarrow.
For description, see GOVT 435.]

[HIST 441 Seminar in the European Enlightenment # (III)
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. Semester TBA. I. Hull.]

HIST 456 Seminar in European Cultural History
Spring. 4 credits. M. Steinberg.
Topic for 2001–2002: TBA.

[HIST 457 Seminar in European Fascism (III)
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. Semester TBA. I. Hull.]

[HIST 460 Opera, History, Politics, Gender (also WOMNS 454, COM L 459, S HUM 459, ITAL 456, MUSIC 474) (III or IV)
Spring. 4 credits. Not offered 2001–2002. M. Steinberg and S. Stewart.
The will to social order and the desire to transgress it: this basic conflict in modern culture was negotiated in many places, but nowhere more dramatically than in the world of opera. Body and mind; the visceral and the mannered; authority and subversion: these themes are integral to operatic works and culture. This seminar examines the works and contexts of Mozart, Beethoven, Wagner, Verdi, and Puccini alongside issues of German and Italian nationbuilding, liberalism, the continuities of patriarchy, and patterns of cultural identity and cultural difference in modern Europe. We analyze opera videos in class, and if possible we arrange an excursion to the Metropolitan Opera in New York City. No technical competence is required, but the seminar should be most interesting to those seeking an upper-level course in cultural history and/or cultural studies.]

[HIST 462 Popular Culture in European History (III)
Fall. 4 credits. Not offered 2001–2002; next offered 2002–2003. S. L. Kaplan.
An examination of the origins, practices, and meanings of popular culture throughout Europe from the Middle Ages to the era of the French Revolution. After considering the various ways in which "culture" and "popular" can be construed, the seminar focuses on the specific manifestations of popular culture, its various languages and gestures, and its complex relations with the dominant/elite cultures.]

HIST 467 Seminar in Modern European Political History (III)
Fall. 4 credits. Permission of instructor required. J. Weiss.

HIST 474 Topics in Modern European Intellectual and Cultural History (also COM L 474) (III or IV)
Fall. 4 credits. Prerequisite: permission of the instructor. D. LaCapra.
Topic for 2001–2002: History and Memory. Drawing on various sources—historical, biographical, testimonial, critical, literary, and cinematic—the course investigates the role of memory in representing the past and shaping the future.

HIST 477 Seminar on the Politics of the Enlightenment # (III)
Fall. 4 credits. S. Kaplan.
An inquiry into the historical origins of European (especially French) political, social, and economic thought, beginning in the 1680s, at the zenith of Louis XIV's absolutism, and culminating in the French Revolution a century later. Emphasis is on the relation of criticism and theory to actual social, economic, religious, and political conditions. An effort is made to assess the impact of enlightened thought on the eighteenth-century world and to weigh its implications for modern political discourse. Readings in translation from such authors as Bayle, Montesquieu, Voltaire, Rousseau, Diderot, and others as well as from modern scholarly and polemical literature.

[HIST 478 Stalinism as Civilization (III)
Fall. 4 credits. Not offered 2001–2002; next offered 2002–2003. P. Holquist.
The collapse of the Soviet Union provides an opportunity to reconsider the entire Stalinist experience, both on the basis of newly accessible documents and from fresh perspectives. This course approaches Stalinism as an entire system, examining the links between high politics, foreign relations, culture, and everyday political strategies. Readings include historical studies as well as newly available primary materials. Knowledge of Russian not required.]

[HIST 482 The Aesthetic and Cultural Theory of the Frankfurt School (also GERST 495) (III or IV)
Fall. 4 credits. Not offered 2001–2002. P. Hohnedahl.]

[HIST 488 Seminar in Late Nineteenth-Century European Imperialism (III)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. I. Hull.
This seminar examines the theories of the "second wave" of European imperialism, and then compares the imperial experiences of Great Britain, France, and Germany. It focuses on the imperialist powers, and on the (often unintended) consequences of their colonial involvement on them. Of special concern are the transformation of nationalism into imperialism, and the effects on the European powers themselves of their experiences of applied racism and the commission of mass violence in their colonies.]

HIST 491 Context of Irish Diaspora (also S HUM 421) (III)
Spring. 4 credits. Limited to 15 students. G. Peatling.
For description see S HUM 421.

[HIST 605 Graduate Seminar in European Cultural and Intellectual History
Fall. 4 credits. Not offered 2001–2002. M. Steinberg.
The topic is "Cultural History, Cultural Memory, Cultural Analysis." We will focus on the epistemological claims and metaphors of cultural historical practice, in particular those of memory and cultural analysis. What are the stakes, advantages, and problems of identifying history with memory or cultural analysis? Readings include works of Freud, Warburg, Benjamin, Yerushalmi, Mieke Bal, and other contemporary sources.]

[HIST 635 The Gates to Modernity: From Karlsbad to the 1848 Revolution (also GERST 635)
4 credits. Anchor course. Not offered 2001–2002. P. Hohendahl.
For description, see GERST 635.]

[HIST 661 Graduate Seminar in Twentieth-Century German History
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. Semester TBA. I. Hull.]

HIST 672 Seminar in European Intellectual History
Fall. 4 credits. D. LaCapra.

HIST 673 Seminar in European Intellectual History
Spring. 4 credits. D. LaCapra.

[HIST 674 Graduate Seminar in German History, 1770–1918
Fall. 4 credits. Not offered 2001–2002. Semester TBA. I. Hull.]

[HIST 675 After the Divide: German Critical Theory of the Seventies and Eighties (also COM L 675 and GERST 675)
Fall. 4 credits. Not offered 2001–2002. P. Hohendahl.
For description, see GERST 675.]

[HIST 678 Seminar in Modern European Social History
Spring. 4 credits. Permission of instructor required. Not offered 2001–2002. J. Weiss.]

HIST 750 European History Colloquium
Fall and spring. 4 credits, each term. Dear, Weil (fall); Steinberg, Caron (spring).
A research colloquium designed for European history graduate students. The colloquium offers a forum for students to present papers and to discuss the work of visiting scholars.

Honors and Research Courses

Note: HIST 301–302 are not regular courses for which students may sign up at will. They are personal arrangements between an instructor and a particular student. Students must first gain the consent of a particular instructor to work with them.

HIST 301 Supervised Reading
Fall or spring. 2 credits. Open only to juniors and seniors. Prerequisite: permission of instructor. Staff.

HIST 302 Supervised Research
Fall or spring. 3 or 4 credits. Open only to upperclass students. Prerequisite: permission of instructor. Staff.

HIST 400 Honors Proseminar
Fall and spring. 4 credits. Limited to 15 students. For prospective honors candidates in history. Prerequisite: permission of a member of the Honors Committee is required to register. Weil (fall); Norton (spring).
An exploration of major approaches to historical inquiry, analysis, and presentation. Ways of thinking about history along with research methods and organization of the results are considered by reading and discussing a variety of historical works. Substantive readings are drawn from several time periods and diverse geographical areas. There is one short paper during the semester, and a longer final paper which explores the work of a major historian or school of historical writing.

HIST 401 Honors Guidance
Fall or spring. 4 credits. Prerequisites: HIST 400 and permission of instructor. Staff.

HIST 402 Honors Research
Fall or spring. 4 credits. Prerequisites: HIST 400 and permission of instructor. Staff.

HIST 703–704 Supervised Reading
703, fall; 704, spring. 4 credits each term. Limited to graduate students. Prerequisite: permission of instructor. Staff.

HIST 709 Introduction to the Graduate Study of History
Fall. 4 credits. Required of all first-year graduate students. P. Holquist and D. Usner.
The course is designed to introduce entering graduate students to crucial issues and problems in historical methodology that cut across various areas of specialization.

HISTORY OF ART

J. E. Bernstock, R. G. Calkins, C. Lazzaro, K. McGowan, L. L. Meixner, A. Pan, A. Ramage

The Department of the History of Art provides a broad range of introductory and advanced courses in Western art (European and North American) and non-Western art (East and Southeast Asian, African), from antiquity to the present.

The Major

Department majors acquire a broad understanding of the history of art in several chronological and geographical areas: ancient, medieval, Renaissance, modern (Europe and North America), Southeast Asia, China, Japan, and Africa. Additionally, majors practice a range of art historical methods and interpretive strategies, including connoisseurship, dendrochronology, feminism, iconography, semiotics, and social history. Majors are encouraged to locate the history of art within allied humanities fields and the applied arts by taking courses in history, literature, history of architecture, and fine arts. The study of foreign languages is strongly encouraged.

Requirements for the Major

Prospective majors should consult the director of undergraduate studies. Students wishing to declare a major in the history of art should complete two courses at Cornell in the department by the end of their sophomore year. These courses should reflect the diversity of the departmental offerings. One must be at the 200 level, and one—but not both—must emphasize material either predominantly before 1800 or outside Europe/North America. These two courses are prerequisites for the major and a grade of C or above is required for admission; courses must be taken for a letter grade. These courses do count toward the total 44 credits. The major in the history of art requires 44 credits, 30 at the 300 level or above. The core requirements are: proseminar; one 400-level area seminar; two courses in art outside Europe/North America; and three courses in art predating 1800 (ancient, medieval, or Renaissance/Baroque). Majors must choose at least two courses from different categories. In addition to the 44 credits, majors are required to take two courses, approved by their advisers, in areas related to the history of art.

Honors

To become a candidate for the degree of Bachelor of Arts with honors in the history of art, a student must have a cumulative average of B+ for all courses taken in the department and in all arts and sciences courses. Application to write an honors thesis should be made to the director of undergraduate studies during the second term of the junior year. The application must include a summary of the proposed project, an endorsement by a faculty sponsor, and a copy of the student's transcript. In the senior year the honors candidate will include in his/her course load, History of Art 600 and 601. These courses address the research and writing of the senior thesis under the direction of the student's project adviser.

Course Numbering System

100–level courses are freshman writing seminars.

200–level courses are introductions to the major subdivisions of Western art and art outside the West.

300–level courses are intermediary courses addressing more specialized topics or epochs.

400–level courses are seminars primarily for advanced undergraduates and graduate students.

500–level courses are seminars primarily for graduate students.

First-Year Writing Seminars

For First-Year Writing Seminar offerings in the History of Art, consult the John S. Knight Institute brochure for times, instructors, and descriptions. These courses may be used as freshman electives but not to satisfy the distribution requirement.

Courses

ART H 200 Art, Archaeology, and Analysis (also ARCH 285, MS&E 285, ENGRI 185, GEOL 200, PHYS 200) (I or IV)
Spring. 3 credits. Staff.
For description see GEOL 200.

ART H 202 Survey of European Art: Renaissance to Modern # (IV)
Summer only. 3 credits. Staff.
The major traditions and movements in western European art from the Renaissance to the modern period. Painting, sculpture, and architecture with an emphasis on painting.

ART H 220 Introduction to Art History: The Classical World (also CLASS 220) # (IV)
Spring. 4 credits. Each student must enroll in a section. A. Ramage.
An overview of the art and archaeology of the Greek and Roman world. The sculpture, vase painting, and architecture of the ancient Greeks from the Geometric period through the Hellenistic, and the art of the Romans from the early Republic to the time of Constantine the Great.

[ART H 221 Minoan-Mycenaean Art and Archaeology (also CLASS 221 and ARKEO 221) # (IV)
Spring. 3 credits. Not offered 2001–2002. J. Coleman.
For description, see CLASS 221.]

[ART H 224 Archaeology in Action I (also CLASS 232 and ARKEO 232) # (IV)
3 credits. Prerequisite: permission of instructor. Not offered 2001–2002. P. I. Kuniholm.]

[ART H 225 Archaeology in Action II (also CLASS 233 and ARKEO 233) # (IV)
3 credits. Prerequisite: permission of instructor. Not offered 2001–2002. P. I. Kuniholm.
Objects from the Classical, Hellenistic, and Roman periods are "dug" out of Cornell basements, identified, cleaned, restored, catalogued, and photographed and are considered in their appropriate historic, artistic, and cultural contexts.]

ART H 230 Introduction to Art History: Monuments of Medieval Art (also RELST 230) # (IV)
Spring. 4 credits. Each student must enroll in a section. R. G. Calkins.
An introduction to the approaches to art history through a study of selected works of art from the Middle Ages: architecture, sculpture, painting, manuscript illumination, metalwork, and ivory.

ART H 245 Introduction to Art History: Renaissance and Baroque Art # (IV)
Fall. 4 credits. Each student must enroll in a section. C. Lazzaro.
A survey of major works of European painting, sculpture, and architecture from 1400 to 1700. The focus is on preeminent artists, workshop methods, style, meaning, patronage, and the function of art in a range of social contexts. The course also covers the methods of art history currently practiced in Renaissance and Baroque studies. Weekly section meetings are required.

ART H 260 Introduction to Art History: The Modern Era (IV)
Fall. 4 credits. Not open to students who have taken ART H 261. Each student must enroll in a section. J. E. Bernstock.
A discussion of the most important developments in art from 1780 to the present in a socio-political, historical context. The emphasis is on such major movements and artists such as Romanticism (Delacroix), Realism (Courbet), Impressionism (Monet), Post-Impressionism (Van Gogh), Cubism (Picasso), Fauvism (Matisse), Surrealism (Miro), Abstract Expressionism (Pollock), and Pop Art (Warhol). Different critical approaches are examined.

[ART H 261 Introduction to Art History: Modern Art (IV)
3 credits. Not offered 2001–2002. Staff.
An introduction to early modern art as it developed between the French Revolution and World War I. Both European and American movements are examined, including Romanticism, Impressionism, and Cubism. Units are organized around central figures such as Mary Cassatt, Edgar Degas, Thomas Eakins, and Vincent van Gogh. Lectures are supplemented with discussions of methods of inquiry, including social history and feminism, fundamental to interpreting works of art.]

[ART H 270 Mapping America (also AM ST 270) # (IV)
4 credits. Each student must enroll in a section. Not offered 2001–2002. L. Meixner.
An introduction to American art from colonial mercantilism through the Great Depression. Through a variety of sources including maps, paintings, street festivals, political cartoons, photographs, and advertisements, we explore the social and economic factors that shaped American identities. Emphasis is on the representation of race, class, and ethnicity.]

ART H 280 Introduction to Art History: Approaches to Asian Art @ # (IV)
Fall. 3 credits. K. McGowan.
Arranged according to selective focus and emphasis rather than broad chronological survey, this course introduces students to the varied responses of the Asian artist in diverse social, geographical, and historical contexts. Indian miniature paintings, Japanese prints, high-fired ceramics from Thailand and Vietnam, Indonesian textiles and jewelry, Javanese shadow-puppet theater, and Balinese ritual and performance traditions are explored. A number of class sessions meet in the Herbert F. Johnson Museum of Art.

ART H 309 Dendrochronology of the Aegean (also CLASS 309 and ARKEO 309) # (IV)
Fall and spring. 4 credits. Prerequisite: permission of instructor. Limited to 10 students. P. I. Kuniholm.
Participation in a research project of dating modern and ancient tree-ring samples from the Aegean and Mediterranean. Supervised reading and laboratory work. A possibility exists for summer fieldwork in the Aegean.

[ART H 319 Art in the Daily Life of Greece and Rome (also CLASS 319) # (IV)
Spring. 4 credits. Not offered 2001–2002. A. Ramage.
Classical art is well reflected in the small items of daily life that are neglected frequently in the standard histories. This course looks at the making and decorating of household items in Greece and Rome in a variety of materials from clay to metal. The links between the commissions of the state and the tastes of the people are examined through their material culture.]

[ART H 320 The Archaeology of Classical Greece (also CLASS 320) # (IV)
4 credits. Not offered 2001–2002. A. Ramage.]

[ART H 321 Mycenae and Homer (also CLASS 321 and ARKEO 321) # (IV)
4 credits. Not offered 2001–2002. J. Coleman.
For description, see CLASS 321.]

[ART H 322 Arts of the Roman Empire (also CLASS 350) # (IV)
Spring. 4 credits. Next offered spring 2003. A. Ramage.
The visual arts in the service of the first world state. The course starts with the architecture, painting, and sculpture of the Etruscan and Republican period but concentrates on monuments of the Imperial era in Italy and the provinces until the time of Constantine. Art made for private patrons is considered, along with the official presentations of the emperors.]

[ART H 323 Painting in the Greek and Roman World (also CLASS 323) # (IV)
4 credits. Not offered 2001–2002. A. Ramage.]

[ART H 325 Greek Vase Painting (also CLASS 325) # (IV)
Fall. 4 credits. Not offered 2001–2002. A. Ramage.
A stylistic and iconographical approach to an art in which the Greeks excelled. The course is arranged chronologically from the early (eleventh century B.C.), anonymous beginnings to the "personal" hands of identifiable masters of the fifth and fourth centuries B.C. Styles of cities other than Athens are stressed.]

[ART H 326 Greek Cities and Towns (also CLASS 326) # (IV)
4 credits. Prerequisite: CLASS/ART H 220 or permission of instructor. Not offered 2001–2002. J. Coleman.]

[ART H 327 Greek and Roman Coins (also CLASS 327) # (IV)
4 credits. Not offered 2001–2002. A. Ramage.
The varied issues of Greek cities and the Roman state are examined. Coins are considered as art objects as well as economic and historical documents. The changes in design, value, and metals from the origins of coinage to the late Roman period are studied. Lectures, student presentations, and work with the actual examples.]

[ART H 328 Greeks and Barbarians (also CLASS 322) # (IV)
Fall. 4 credits. Not offered 2001–2002.
J. Coleman.
For description, see CLASS 322.]

[ART H 329 Greek Sculpture (also CLASS 329) # (IV)
4 credits. Not offered 2001–2002.
J. Coleman.
For description, see CLASS 329.]

ART H 332 Medieval Architecture (also ARCH 382, RELST 332) # (IV)
Fall. 4 credits. R. G. Calkins.
A survey of medieval architecture from the Early Christian period to the Late Gothic (A.D. 300–1500). Considerable emphasis is placed on the development of structural systems and on the form, function, and meaning of important medieval buildings.

[ART H 333 Early Medieval Art and Architecture # (IV)
4 credits. Not offered 2001–2002.
R. G. Calkins.
Sculpture, painting, and architecture in the period from the late antique through the Carolingian era (A.D. 300–900). The evolution of the early Byzantine tradition is also considered.]

[ART H 335 Gothic Art and Architecture (also RELST 335) # (IV)
4 credits. Not offered 2001–2002.
R. G. Calkins.]

[ART H 336 Prelude to the Italian Renaissance (also RELST 336) # (IV)
4 credits. Not offered 2001–2002.
R. G. Calkins.
An examination of Italian art, beginning with twelfth-century Sicily, and with emphasis on thirteenth- and fourteenth-century sculpture, painting, and to a lesser extent, architecture, which includes the works of Duccio, Giotto, the Pisani, and Lorenzetti as the prelude to the Italian Renaissance.]

ART H 337 The Medieval Illuminated Book (also RELST 337) # (IV)
Fall. 4 credits. R. G. Calkins.
A study of selected major examples of medieval illuminated manuscripts from between A. D. 300 and 1500. Facsimiles of major manuscripts such as the Lindisfarne Gospels, the Book of Kells, and the Hours of Mary of Burgundy are examined. Students write a research paper on a manuscript of their choice. Two lectures, plus a session each week in the Rare Book Room.

ART H 338 Modern Western Drama, Modern Western Theater: Theory and Practice (also COM L 335 and THETR 335) (IV)
Fall. 4 credits. R. Schneider.
A study of drama and the culture contexts of its performances from the mid-nineteenth century to the mid-twentieth century in Europe and America. We move from symbolism and naturalism through to constructivism, expressionism, Dadaism, futurism, surrealism and on the Brecht, Artaud and a few of their more contemporary descendants. Students engage in performance projects as well as text analysis.

[ART H 341 Flemish Painting (also RELST 342) # (IV)
4 credits. Not offered 2001–2002.
R. G. Calkins.
An examination of Flemish painting in the fifteenth century, with emphasis on the works of Robert Campin, Jan van Eyck, Roger van der Weyden, Hugo van der Goes, Hans Memling, and ending with Jerome Bosch. Issues of the social, economic, and devotional context are discussed as they pertain to the particular development of Northern Realism and Symbolism during this century.]

[ART H 343 Italian Renaissance of the Fifteenth Century # (IV)
4 credits. Not offered 2001–2002.
C. Lazzaro.
This course examines the artistic production of the fifteenth century in its social and cultural context. The new style, which was developed in Florence in the early century and spread to other city-states in Italy, is examined in the context of the new educated class, the increased wealth of the mercantile, urban class, and the new role of family in society.]

ART H 344 Italian Renaissance of the Sixteenth Century: Leonardo, Michelangelo, and Raphael # (IV)
Spring. 4 credits. C. Lazzaro.
This course focuses on the three great artists of the late fifteenth and sixteenth centuries, Leonardo, Michelangelo, and Raphael. It examines each as a thinker as well as an artist, through their own writings together with their works of painting, sculpture, and architecture. It also analyses the contemporary constructions of the artist as genius and as courtier in the biographies and other writings about them.

[ART H 345 Rome, Florence, and Venice in the Sixteenth Century # (IV)
4 credits. Not offered 2001–2002.
C. Lazzaro.
This course examines the distinctive cultural identities of Rome, Florence, and Venice, and how art, architecture, and urban planning served to create the myths and self-images of these cities, their rulers, and society. Topics include the centers of power, relationship of church and state, and private patronage and collections.]

[ART H 348 Renaissance Art In Northern Europe: The Sixteenth Century # (IV)
4 credits. Not offered 2001–2002. Staff.
This course examines the painting, graphic arts, and sculpture of Northern Europe in the sixteenth century. Principal emphasis is on art produced in the Netherlands and Germany. Topics considered include patronage and audience in different regions of Northern Europe, the importance of fifteenth-century traditions, the impact of Italian art, and the development of specifically northern forms of artistic expression in religious and secular art, including landscape, portraiture, and genre painting. Among the themes we explore are constructions of gender and representations of women in Northern Renaissance art, attitudes to peasants and the urban lower classes, the impact of the Protestant Reformation and iconoclasm, and the development of the art market in the North. Artists considered include Bosch, Bruegel, Dürer, and Grünewald.]

[ART H 351 The Culture of the Renaissance II (also COM L 362, HIST 364, MUSIC 390, RELST 362, ENGL 325) # (III or IV)
4 credits. Not offered 2001–2002.
W. J. Kennedy, C. Kaske.
For description, see COM L 362.]

ART H 360 Painting Nineteenth-Century America (also AM ST 360) # (IV)
Spring. 4 credits. L. L. Meixner.
This course is an interdisciplinary view of art and life in nineteenth-century America from the colonial era through the Gilded Age. We will consider definitions of democratic culture through topical units including the following: New England portraiture and commodity culture; the art museum in the new republic; genre painting in the Jacksonian era; Hudson River landscape and railroad expansion; photography and the rising middle class; images of African Americans and Reconstruction; images of Native Americans, Manifest Destiny, and the frontier myth; cosmopolitain taste and robber barons in the Gilded Age. Alongside key paintings, we look at print culture including daguerreotypes, postcards, political prints, photographs, and advertisments. Major artists include: John S. Copley, George Caleb Bingham, Winslow Homer, Thomas Eakins, Mary Cassat, and John Singer Sargent. We address their relationship to major writers including Walt Whitman, Henry James, Stephen Crane, and Edith Wharton.

ART H 362 Impressionism in Society (also WOMNS 361) (IV)
Fall. 4 credits. L. L. Meixner.
This course discusses French Impressionist art as products of nineteenth-century public life. By relating Impressionism to state culture, including Universal Expositions, we trace subversive themes such as criminality, cafe and brothel societies, clandestine prostitution, and class-regulated leisure. We consider images of Parisian spectacle and commodity culture (Manet, Cassat, Degas, Toulouse-Lautrec) as well as French landscapes (Monet, Van Gogh, Pissarro). Special topics include artists' relationships to novelists (Zola), poets, and the avant garde theatre as well as the construction of the artist and courtesan in Puccini's "La Boheme" and Verdi's "La Traviata." Images include postcards, playbills, medical photographs, and posters. Organizing our historical units is the theme of power and vision, with attention to the female gaze, voyeurism, surveillance, and scopophilia.

[ART H 365 U.S. Art From FDR to Reagan (also AM ST 355) (IV)
Fall. 4 credits. Not offered 2001–2002.
J. E. Bernstock.
Course covers major artists and movements in the United States since 1940, beginning with Jackson Pollock and Abstract Expressionism, and continuing through recent developments in art. Attention is devoted to the critical reception that artists have received and to artists' statements themselves.]

[ART H 370 Visual Culture and Social Theory (also GOVT 375 and COM L 368) (III or IV)
4 credits. Not offered 2001–2002.
S. Buck-Morss.
For description, see GOVT 375.]

ART H 371 Architectural History of Washington, D.C. # (IV)
Fall or spring. Variable credit. Only for students in the Cornell-in-Washington program. Only for non-architects. P. Scott.
A historical and critical survey of the architecture of Washington. Attention is given to the periods, styles, architects, and clients—public and private—of the notable buildings and to the urbanscape of the nation's capital.

The vocabulary of architectural analysis and criticism is taught. Field trips required.

ART H 377 African American Art (also AS&RC 304) (IV)
Spring. 3 credits. S. Hassan.
For description, see AS&RC 304.

ART H 378 Art in African Culture and Society (also AS&RC 310) @ (IV)
Fall. 3 credits. S. Hassan.
For description, see AS&RC 310.

ART H 380 Introduction to the Arts of China (also ARKEO 380 and ASIAN 383) @ # (IV)
Spring. 4 credits. A. Pan.
This course offers a survey of the art and culture of China, from the Neolithic period to the twentieth century. We begin with an inquiry into the meaning of national boundaries and the controversy of the Han Chinese people, which helps us identify the scope of Chinese culture. Pre-dynastic (or prehistoric) Chinese culture is presented through both legends about the origins of the Chinese, and scientifically excavated artifacts. Art of the dynastic and modern periods is presented in light of contemporaneous social, political, geographical, philosophical and religious contexts. Students work directly with objects in the Herbert F. Johnson Museum of Art.

[ART H 384 Introduction to the Arts of Japan @ # (IV)
Spring. 4 credits. Not offered 2001–2002. A. Pan.
As an island nation east of the Asian continent, Japan developed a unique culture that reflects both continental and indigenous characteristics. This course examines pre-and post-contact with continental culture and the process of artistic acculturation and assimilation in successive periods of Japanese art history.]

[ART H 385 Representation and Meaning in Chinese Painting (also ASIAN 384) @ # (IV)
4 credits. Not offered 2001–2002. A. Pan.
Using major monuments of art, this course introduces various genres of Chinese painting through socio-political and religious history. The focus is on understanding the aesthetic criteria, artistic movements, stylistic transformations, and agendas of different social classes. Weekly sections will meet at the Herbert F. Johnson Museum so that students can gain first-hand experience examining and handling Chinese paintings.]

ART H 395 The House and the World: Architecture of Asia (also ASIAN 394) @ # (IV)
Spring. 4 credits. K. McGowan.
In many Asian societies, houses are regarded as having a life force or a vitality of their own. This course examines the role of the house as a living organism in Asia, a symbol of the cosmos encapsulated. Houses also function in many societies as storehouses for material and immaterial wealth; artifacts such as textiles, jewelry, sculptures, and masks function within the house as ancestral heirlooms, conveying their own currents of life force, the power from which serving to blend with the vitality of the house. This accumulation of energy can be conferred on the inhabitants, or it may exist as a quiet reservoir of power, distinct from its occupants. The indigenous architectural traditions of India, Vietnam, Thailand, Indonesia, and the Philippines are examined. By studying the inhabited spaces of others, divining their technologies of construction and their applied symbologies, students are provided with powerful tools for examining the visual skills and sensibilities of other cultures. "The House and the World" serves as the metaphor for these discoveries.

[ART H 396 The Arts of Southeast Asia @ # (IV)
4 credits. Not offered 2001–2002.
K. McGowan.
The arts of Southeast Asia are studied in their social context, since art plays a role in most of the salient occasions in life in traditional societies. Special emphasis is devoted to developments in Indonesia, Thailand, and Cambodia. Among topics covered are the shadow puppet theater of Java, textiles, architecture, sculpture, and Bali's performance tradition.]

Seminars

Courses at the 400 and 500 level are open to juniors and seniors, majors, and graduate students. All seminars involve the writing and presentation of research papers. Enrollment is limited to 15 students, and *permission of the instructor is required*. Students may repeat courses that cover a different topic each semester.

ART H 400 Proseminar for Art History Majors: The History and Practice of Art History (IV)
Fall. 4 credits. Prerequisite: History of Art majors only. Enrollment is limited.
K. McGowan.
Works of art have always engendered political, social, and cultural meanings. This seminar presents an introduction to the methods which art historians have engaged in studying the objects and ideas which constitute the historiography of their discipline. Challenged and enlarged by cultural debates over issues of class, ethnicity, nationality, sexual orientation, and gender, the field of art history is expanding to incorporate problems of assessing quality of intention and reception along with authorship, of artistic production in place of artistic creation, and of Western-oriented attitudes to race in reference to orientalism and colonialism. Readings focus on historically situating methods used to situate art historically, and on the implications of their cross-cultural application. Papers encourage students to put methods into practice, realizing in the process that subject matter is not an isolated choice to which methods are applied, but something which profoundly affects the approach which the researcher brings to the writing of art history.

ART H 400 Proseminar
Fall. 4 credits. Prerequisite: History of Art majors only. Enrollment is limited.
K. McGowan.
Works of art have always engendered political, social, and cultural meanings. This seminar presents an introduction to the methods which art historians have engaged in studying the objects and ideas which constitute the historiography of their discipline. Challenged and enlarged by cultural debates over issues of class, ethnicity, nationality, sexual orientation, and gender, the field of art history is expanding to incorporate problems of assessing quality of intention and reception along with authorship, of artistic production in place of artistic creation, and of Western-oriented attitudes to race in reference to orientalism and colonialism. Readings focus on historically situation methods and implications of their cross-cultural application. Papers encourage students to put methods into practice, realizing in the process that subject matter is not an isolated choice to which methods are applied, but something which profoundly affects the approach which the researcher brings to the writing of art history.

ART H 401 Independent Study
Fall or spring. 2–4 credits. May be repeated for credit. Prerequisite: permission of a department faculty member.
Individual investigation and discussion of special topics not covered in the regular course offerings, by arrangement with a member of the department.

ART H 402 Independent Study
Fall or spring. 2–4 credits. May be repeated for credit. Prerequisite: permission of a department faculty member.
Individual investigation and discussion of special topics not covered in the regular course offerings, by arrangement with a member of the department.

[ART H 403 Ritual, Play, Spectacle, Act: Performing Culture (also THETR 403 and 603) (IV)
Fall. 4 credits. Not offered 2001–2002.
R. Schneider.
For description, see THETR 403.]

ART H 407 The Museum and the Object (IV)
Fall. 4 credits. Prerequisite: permission of instructor. All classes meet in the Johnson Art Museum Study Gallery. L. L. Meixner.
This seminar gives advanced Art History majors the opportunity to work directly with original objects from collections in the Herbert F. Johnson Museum. The course focuses on art and connoisseurship by questioning the ways quality is determined in works of art. Topics include methods of attribution, fakes and forgeries, technique and media, restoration and conservation, art education and theories of perception. Session leaders include the curatorial staff of the art museum.

[ART H 423 Ceramics (also CLASS 423 and ARKEO 423) # (IV)
4 credits. Not offered 2001–2002.
A. Ramage.
Bronze Age, Greek, and Roman pottery specimens from Near-Eastern and Mediterranean sites are studied to provide direct experience of one of the basic prerequisites of archaeological excavation—the identification and dating of pottery types. Reports, delivered in class, concern ancient ceramic materials or particular types and periods of ceramics. Practical experience in making and decorating pottery is encouraged.]

[ART H 424 Sardis and the Cities of Asia Minor (also ARKEO 432 and CLASS 432) # (IV)
4 credits. Not offered 2001–2002.
A. Ramage.]

[ART H 425 Seminar on the Bronze Age Architecture of Asia Minor (also CLASS 430 and ARKEO 425) # (IV)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002.
P. I. Kuniholm.
The course covers major architectural building programs from Neolithic Catal Hüyük, Beycesultan, to the final phases of Troy and Hittite Bogazköy. The art and archaeology of these civilizations is taken into account when relevant. Reading knowledge of German useful.]

ART H 427 Seminar on Roman Art and Archaeology (also CLASS 435 and ARKEO 435) # (IV)
Spring. 4 credits. Not open to freshmen or sophomores without permission of instructor. A. Ramage.
Topic for spring 2002: The Afterlife of Roman and Classical Art.

[ART H 430 America in the Camera's Eye (also HIST 430 and AM ST 430.2) (III or IV)
Fall. 4 credits. Not offered 2001–2002. R. L. Moore.
For description, see HIST 430.]

ART H 434 The Rise of Classical Greece (also ARKEO 434 and CLASS 434) # (IV)
Spring. 4 credits. Recommended: CLASS 220 or ART H 220, CLASS 221 or ART H 221, or permission of instructor. P. I. Kuniholm.
The art and archaeology of the Greek dark ages. Topics include: site reports, pottery, metalworking, the introduction of the alphabet, the beginnings of coinage, and links with Anatolia and the Near East.

[ART H 446 Renaissance Patronage and the Medici (also HIST 479) # (III)
Spring. 4 credits. Not offered 2001–2002. Staff.
Between the early fifteenth and later sixteenth centuries, the Medici family of Florence rose from the ranks of the city's merchant bankers to become virtual rulers of the republic, cardinals and popes in Rome, and, eventually, heredity grand dukes of Tuscany. Much of the family's power and fame derived from two kinds of patronage: the social and political patronage that first established their faction and party and then enabled them to maintain control; and the artistic and cultural patronage that was central both to the fashioning of the family's image and to the realization of its princely ambitions. This interdisciplinary seminar explores the connections between the two types of patronage employed so effectively by the Medici. We focus on primary source materials, on works of art and architecture, and on recent historical and art historical scholarship concerned with the Medici and with patronage in Renaissance Italy.]

ART H 447 Aesthetic Theory: End of Art (also GERST 656 and COM L 656)
Fall. 4 credits. Permission of Instructor. P. Gilgen.
For description, see GERST 656.

[ART H 448 Studies in Sixteenth-Century European Art # (IV)
4 credits. Not offered 2001–2002. C. Lazzaro.
Topic: Constructing the Self in the Sixteenth Century. This seminar examines portraits, self-portraits, autobiographies, and biographies, as well as treatises on etiquette and behavior. In this society, "civility," the mark of class and education, was conveyed through bearing, gesture, manners, and speech, as well as social organization and artistic interests, all of which are evident in both visual and verbal representations of individuals.]

ART H 450 Women in Italian Renaissance Art (also WOMNS 451) # (IV)
Spring. 4 credits. Prerequisite: permission of instructor. C. Lazzaro.
This seminar examines representations of the Madonna and Child from the fourteenth and fifteenth centuries, the narrative scenes painted on chests and other domestic furniture, biblical and historical heroines such as Judith and Lucretia, portraits of patrician women and courtesans, and violence to women in a political context. It investigates the contemporary ideas about motherhood, beauty, sexuality, social presentation, and gender roles in society that inform these representations. We discuss the existing critical frameworks for interpreting them in feminst art history and theory (particularly in Renaissance studies). We are concerned especially with how visual images are encoded with meaning, what kind of relationship can be established with their historical context, and how they convey social constructs as ideology.

[ART H 451 Prints of the Fifteenth through the Seventeenth Century # (IV)
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. C. Lazzaro.
This seminar has several aims: to introduce students to prints—the techniques, styles, and issues of connoisseurship—and to the major printmakers of the period, including Marcantonio Raimondi, Dürer, and Rembrandt; to give students first-hand experience with works of art in the Herbert F. Johnson Museum; and to consider the social and cultural issues raised in the medium of prints and through their unique visual language. These issues include the social hierarchies of class and gender (including witches), moral concerns and religious devotion, the construction and transmission of notions of antiquity and classicism, and the representation of the urban and rural environment. Students give brief presentations on prints in the collection and longer ones of their own research projects on these and related topics.]

ART H 461 Art and Social Histories (also COM L 461) # (IV)
Spring. 4 credits. Prerequisite: permission of instructor. Auditing is not permitted. L. L. Meixner.
Topic for spring 2002: Landscape as Ideology. This seminar considers images of land as cosmos, empire, fantasy, memory, and marvel. We approach our focal issue—land and capital—via Old and New World encounters, the political picturesque, rural enclosure, the Grand Tour and the tourist sublime, colonial and post-colonial spaces, the "greening of capitalism," the feminization of nature, and the transparency of utopia. In addition to art historical texts, our readings include the diaries of artist-explorers, discovery and conquest narratives, nature writing, and ecocriticism. Darwin, Thoreau, S. J. Gould, and Greenblatt number among our authors. Crossing boundaries, we discuss illuminated manuscripts, early modern pastorals (Europe and England), the symbolic frontier (U.S.A. and Russia), the topographic body and HGP, earthart, national parks, the Land of Oz and Eurodisney.

[ART H 462 Topics in Early Modernism (IV)
4 credits. Prerequisite: permission of instructor. Auditing is not permitted. Not open to freshmen or sophomores. Not offered 2001–2002. L. L. Meixner.
Early Modernism in America. Using the Armory Show (1913) as its center, this interdisciplinary seminar examines the varied expressions of American modernism prior to World War II. Against the backdrop of post-World War I social politics and the Jazz Age, we examine: the machine aesthetic and kinetic poetry, icons such as the Brooklyn Bridge, O'Keefe, Stieglitz, and the rise of photography at "291," American Dada, the Harlem Renaissance, and the introduction of homoerotic imagery. Aside from major artists, key figures include Gertrude Stein, Dos Passos, Hart Crane, and Ernest Hemmingway.]

[ART H 463 Studies in Modern Art (IV)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. J. E. Bernstock.
An Analysis of Abstract Art in Europe (1910–1920). Various reasons have been cited for the emergence of abstract art in Europe between 1910 and 1920. This seminar considers the historical context, the philosophical literature, and the developments in art criticism that had a bearing on the evolution of abstract art in the Netherlands, Germany, and Russia.]

[ART H 464 Studies in Modern Art (IV)
Spring. 4 credits. Prerequisite: ART H 365 and permission of instructor. Auditing is not permitted. Not offered 2001–2002. J. E. Bernstock.
Subjectivism in Art of the 1980s. This seminar examines the tendency toward a subjective form of art in the United States and in Germany during the 1980s, and the reasons for its international impact. The political and economic circumstances in the two countries as well as related art criticism are studied.]

ART H 466 Women Artists (also WOMNS 404) (IV)
4 credits. Prerequisite: permission of instructor. J. E. Bernstock.
This seminar studies the work of women artists from antiquity to the present. We consider the works of the most prominent women artists from each period in relation to the changing roles of women in society. The artists covered include Jennifer Bartlett, Artemisia Gentileschi, Elizabeth Vigee-Lebrun, Mary Cassatt, Käthe Kollwitz, Georgia O'Keeffe, Louise Nevelson, Joan Mitchell, Judy Chicago, and Barbara Kruger. Different critical approaches to feminist art are discussed.

[ART H 476 Seminar in American Art (IV)
4 credits. Not offered 2001–2002. L. L. Meixner.]

ART H 478 African Cinema (also AS&RC 435) @ (IV)
Fall. 4 credits. S. Hassan.
For description, see AS&RC 435.

[ART H 481 Art of the Tang Dynasty (618–907) (also ASIAN 479) @ # (IV)
Spring. 4 credits. Prerequisite: ART H 383 or a course in Chinese history or Chinese literature and permission of instructor required. Not offered 2001–2002. A. Pan.
This seminar explores art and culture of the Tang dynasty, China's "golden age," by focusing on new discoveries and museum objects representing court, secular, and Buddhist art. We examine how imperial taste, patronage, and aesthetics influenced painting, calligraphy, gold and silver wares, ceramics, and important architectural and cave-temple sites.]

[ART H 483 Arts of the Song Dynasty (960–1279) @ # (IV)
4 credits. Not offered 2001–2002. A. Pan.
This seminar surveys arts of the Song dynasty, a period of introversion and high refinement. Through readings, class discussions, and visits to the Herbert F. Johnson Museum of Art, students gain knowledge of painting (landscape, figure, horse, flower-and-bird, literati traditions, and theories), calligraphy, Song antiquarianism, imperial patronage, religious art (painting, sculpture, and temples), and ceramics.]

[ART H 490 Art and Collecting: East and West (also ASIAN 491) @ # (IV)
Spring. 4 credits. Not offered 2001–2002. K. McGowan.
This course examines the social life of things, focusing in particular on the collection as an organizing metaphor for cross-cultural exploration. By examining biographies of objects, and the extent of their influence, it is possible to observe the transformation of gifts or heirlooms into commodities and vice versa as constellations of cultures appropriate objects and ideas across vast distances, East and West. India, Europe, China, America, Japan, and Mainland and Island Southeast Asia are examined at different points historically where dynamic convergences occur in the traffic of culture.]

[ART H 520 Seminar in Classical Archaeology (also CLASS 630 and ARKEO 520)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. J. Coleman.
For description, see CLASS 630.]

ART H 531 Problems in Medieval Art and Architecture (also RELST 531)
Spring. 4 credits. Prerequisite: permission of instructor. R. G. Calkins.
Topic for spring 2002: Archaeology of the Book. A detailed investigation of the methods and procedures of examining medieval illuminated manuscripts. Emphasis is on understanding the handwritten book as a functioning object: its production, decoration, use, and reception. Students conduct research on a facsimile of a medieval manuscript amongst those housed in the Rare and Manuscript Collections in Kroch Library. Discussions, reports on readings, and presentations of research paper in class.

ART H 540 Seminar in Renaissance Art
4 credits. Prerequisite: permission of instructor. C. Lazzaro.
Topic for fall 2001: Nature, Cultural Landscape, and Gardens in Early Modern Italy. This seminar examines cultural understandings of nature, the paired concepts of nature and culture, and the representations of nature in gardens. We consider the "second nature"—human interventions in the natural world, and the resulting "cultural landscape"—in both the actuality and painted representations of the countryside. The cultural significance of plants and plant foods and of animals, the revived literary genre of the pastoral, and collections of nature are all examined. Reflecting on the flourishing gardens from the sixteenth century we discuss how these cultural concepts of nature are manifested in garden design, planting and ornamentation.

[ART H 549 Problems in Interpretation in Italian Renaissance Art
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. C. Lazzaro.
This seminar examines assumptions about meaning and how meaning is produced in Renaissance art. Various interpretative strategies are examined, among them iconographic, semiotic, feminist, and psychoanalytic, within a specifically Renaissance literary, intellectual, and social context. Texts by Panofsky and critical discussions of them, Baxandall, Bryson, and others are read and discussed with reference to particular works of art. The seminar is intended primarily for graduate students in all areas of the history of art and those in other disciplines with an interest in the Italian Renaissance. Senior History of Art majors with background in the Italian Renaissance are also welcome.]

ART H 571 African Aesthetics (also AS&RC 503)
Spring. 4 credits. S. Hassan.
For description, see AS&RC 503.

ART H 580 Problems in Asian Art (also ASIAN 602 and RELST 580)
Spring. 4 credits. Prerequisite: permission of instructor. K. McGowan.
Topic for 2002: Water: Art and Politics in Southeast Asia. This seminar focuses on the significance of water—economic, religious, political, social—and its role in the art and architecture of Mainland and Island Southeast Asia. While India and China can be seen to provide aquatic themes and patterns for transformation, the emphasis in this course is on local ingenuity, how technologies of water use and control at ancient sites in Southeast Asia can be seen to shape vivid visual symbologies, past and present.

ART H 591–592 Supervised Reading
591, fall; 592, spring. 4 credits. May be repeated for credit. Limited to graduate students.

ART H 600 Honors Work
Fall or spring. 8 credits. Intended for senior art history majors who have been admitted to the honors program.
Basic methods of art historical research are discussed and individual readings assigned, leading to the selection of an appropriate thesis topic.

ART H 601 Honors Work
Fall or spring. 8 credits. Prerequisite: ART H 600.
The student under faculty direction prepares a senior thesis.

HUNGARIAN

See Departments of Linguistics and Russian.

INDONESIAN

See Department of Asian Studies.

FALCON PROGRAM (INDONESIAN)

See Department of Asian Studies.

ITALIAN

See Department of Romance Studies.

JAPANESE

See Department of Asian Studies.

JAVANESE

See Department of Asian Studies.

JEWISH STUDIES

See Program of Jewish Studies under "Special Programs and Interdisciplinary Studies."

KHMER (CAMBODIAN)

See Department of Asian Studies.

KNIGHT, JOHN S., INSTITUTE FOR WRITING IN THE DISCIPLINES

See John S. Knight Institute in "Special Programs and Interdisciplinary Studies."

KOREAN

See Department of Asian Studies.

LATIN

See Department of Classics.

LINGUISTICS

A. Cohn, chair (203D Morrill Hall); D. Zec, director of graduate studies (219 Morrill Hall); W. Harbert, director of undergraduate studies (210 Morrill Hall); D. Abusch, J. Bowers, W. Browne, C. Collins, M. Diesing, S. Hertz, S. McConnell-Ginet, A. Miller-Ockhuizen, A. Nussbaum, M. Rooth, C. Rosen, M. Suñer, M. Weiss, J. Whitman, J. Wolff.

Linguistics, the systematic study of human language, lies at the crossroads of the humanities and the social sciences, and much of its appeal derives from the special combination of intuition and rigor that the analysis of language demands. The interests of the members of the Department of Linguistics and linguistic colleagues in other departments span most of the major subfields of linguistics: phonetics and phonology, the study of speech sounds; syntax, the study of how words are combined; semantics, the study of meaning; historical linguistics, the study of language change over time; and sociolinguistics, the study of language's role in social and cultural interactions.

Studying linguistics is not a matter of studying many languages. Linguistics is a theoretical discipline with ties to such areas as cognitive psychology, philosophy, logic, computer science, and anthropology. Nonetheless,

knowing particular languages (e.g., Spanish or Japanese) in some depth can enhance understanding of the general properties of human language. Not surprisingly, then, many students of linguistics owe their initial interest to a period of exposure to a foreign language, and those who come to linguistics by some other route find their knowledge about languages enriched and are often stimulated to embark on further foreign language study.

Students interested in learning more about linguistics and its relationship to other disciplines in the humanities and social sciences are encouraged to take Linguistics 101, a general overview, which is a prerequisite for most other courses in the field, or one of the first-year writing seminars offered in linguistics (on topics such as metaphor and the science of language). Linguistics 101 and other introductory courses fulfill the social science distribution requirement. Most 100- and 200-level courses have no prerequisites and cover various topics in linguistics (e.g., LING 170, Introduction to Cognitive Science; LING 285, Linguistic Theory and Poetic Structure) or focus on the linguistics of a particular geographic region or historical development of particular languages (e.g., LING 217, History of the English Language; LING 239, The Celtic Languages). Some of these courses also fulfill the breadth requirements.

Talks and discussions about linguistics are offered through the Undergraduate Linguistics Forum and the Linguistics Colloquium (sponsored by the department and the Cornell Linguistic Circle). These meetings are open to the university public and anyone wishing to learn more about linguistics is most welcome to attend.

The Major

For questions regarding the linguistics major, contact Professor Wayne Harbert (210 Morrill Hall, 255–8441, weh2@cornell.edu).

The prerequisite for a major in linguistics is the completion of LING 101 and either LING 201 or 203. The major has its own language requirement, which should be completed as early as possible: qualification in two languages other than English, one of which must be either non-European or non-Indo-European. With approval of the department's director of undergraduate studies, this requirement may be waived (i.e., reduced to the normal arts college language requirement) for students taking the cognitive studies concentration or a double major.

The other standard requirements for the linguistics major are as follows:

1) LING 201 (Introduction to Phonetics and Phonology) or LING 203 (Introduction to Syntax and Semantics), whichever one was not taken as a prerequisite to the major
2) LING 314 (Historical)
3) Three of the following five courses, one of which must be either Phonology I or Syntax I:

   LING 301 (Phonology I)

   LING 303 (Syntax I)

   LING 309 (Morphology)

   LING 319 (Phonetics I)

   LING 421 (Semantics I)

4) A course at or beyond the 300 level in the structure of English or some other language, or a typological or comparative structure course such as Linguistics 401 or Field Methods (LING 300)
5) One additional linguistics course for at least four credit hours, which may be a course with significant linguistic content in a related field.

Some substitutions to these standard requirements are possible after consultation with your adviser and approval by the DUS.

Honors

Applications for honors should be made during the junior year or by the start of fall term of the senior year. For further information, please contact the DUS. Candidates for admission must have a 3.0 (B) average overall and should have a 3.2 average in linguistics courses. In addition to the regular requirements of the major, the candidate for honors will complete an honors thesis and take a final oral examination in defense of it. The thesis is usually written during the senior year but may be started in the second term of the junior year when the student's program so warrants. The oral examination will be conducted by the honors committee, consisting of the thesis adviser and at least one other faculty member in linguistics. Members of other departments may serve as additional members if the topic makes this advisable. LING 493 and 494 may be taken in conjunction with thesis research and writing but are not required.

First-Year Writing Seminars

For descriptions, consult the John S. Knight brochure for times, instructors, and descriptions.

Courses

LING 101 Introduction to Linguistics (III)
Fall or spring. 4 credits each term. Fall, J. Whitman; spring, M. Diesing.
An introductory course designed to provide an overview of the science of language, especially its theoretical underpinnings, methodology, and major findings. The course focuses on the basic analytic methods of several subfields of linguistics including phonetics, phonology, morphology, syntax, semantics, language variation, language change, and psycholinguistics.

LING 109 English Words: Histories and Mysteries (also CLASS 109) #
Fall. 3 credits. M. Weiss.
Where do the words we use come from? This course examines the history and structure of the English vocabulary from its distant Indo-European roots to the latest in technical jargon and slang. Topics to be discussed include formal and semantic change, taboo and euphemism, borrowing, new words from old, "learned" English loans from Greek and Latin, slang, and society.

LING 131–132 Elementary Sanskrit (also CLASS 131–132 and SANSK 131–132)
For description, see SANSK 131–132.

LING 170 Introduction to Cognitive Science (also COGST 101, COM S 101, PHIL 102, and PSYCH 102)
For description, see COGST 101.

LING 201 Introduction to Phonetics and Phonology (III)
Spring. 4 credits. Prerequisite: LING 101 or equivalent or permission of instructor. A. Cohn.
An introduction to the study of human speech sounds and how they pattern in languages. The first part of the course focuses on phonetics: the production, acoustics, and perception of speech, with attention to both the common and the less common sounds of the world's languages. The second part of the course focuses on phonology: how human speech sounds pattern within and across languages, with an emphasis on the rules that govern these patterns and their possible representation.

LING 203 Introduction to Syntax and Semantics (III)
Fall. 4 credits. Prerequisite: LING 101 or equivalent or permission of instructor. M. Diesing.
This course focuses on language as a system of knowledge that enables native speakers to create and interpret the structures of their language. Part of the course considers issues of syntactic structure, such as the order of constituents, the hierarchical organization of grammars, and syntactic universals. The other part of the course focuses on meaning and interpretation, addressing such issues as the role of context, how information is structured, and how it is encoded in the syntax.

[LING 212 Language and Culture (III)
Spring. 3 credits. Not offered 2001–2002; next offered 2002–2003. J. Whitman.
We often assume that there is a close relationship between differences in language and cultural variation. This course focuses on that relationship, beginning with an examination of the linguistic relativity hypothesis, which posits a link between basic properties of languages and crosscultural differences in world view. We also examine potential cultural determinants of variation in language: pronouns and honorific systems, systems of ritual and taboo in language, and the impact of narrative organization on grammar. Special attention is paid to 'extreme' forms of language: invented languages from Esperanto to Klingon; glossolalia and trance languages; language games and secret languages.]

[LING 215/715 Psychology of Language (also PSYCH 215) (III)
Not offered 2001–2002.
For description, see PSYCH 215.]

[LING 216 Mathematical Linguistics (II)
Spring. 4 credits. Not offered 2001–2002. Staff.
The course is an introduction to the mathematical concepts and techniques most frequently used in theoretical linguistics.]

LING 217 History of the English Language (also ENGL 217) # (III or IV)
Fall. 4 credits. W. Harbert.
This course explores the development of the English language from its Indo-European beginnings to the present. Topics covered include changes in sound, vocabulary and grammatical structure, external influences, Old English, Middle English, Standard English, dialects, and World Englishes.

[LING 230 Introduction to Southeast Asian Languages and Linguistics @ (III)
Not offered 2001–2002.]

[LING 236 Introduction to Gaelic
Spring. 3 credits. Not offered 2001–2002. W. Harbert.
This course is an introduction to the history, structure, and current status of the Scottish Gaelic language, oriented around elementary Gaelic texts.]

[LING 237 The Germanic Languages (III)
Fall. 4 credits. Not offered 2001–2002. W. Harbert, M. Diesing.
This course surveys the history, structure, and use of the modern Germanic languages (English, German, Dutch, Afrikaans, Swedish, Danish, Icelandic, Norwegian, Faroese, and Yiddish).]

LING 238 Introduction to Welsh
Fall. 3 credits. W. Harbert.
This course surveys the history, structure, cultural, and political situation of the Welsh language. It includes several sessions of elementary language instruction and a brief introduction to Welsh literature.

[LING 239/539 The Celtic Languages (III)
Fall. 4 credits. Graduate students register under LING 539. Not offered 2001–2002. W. Harbert.
This course surveys the history, structure, and political and social situation of the Celtic languages (Welsh, Scottish Gaelic, Irish Gaelic, Breton, Cornish, and Manx). The course includes a few days of introductory language instruction in some of these languages.]

[LING 241 Yiddish Linguistics (also JWST 271) (III)
Fall. 3 credits variable. Not offered 2001–2002; next offered 2002–2003. M. Diesing.
This course covers a wide variety of topics relating to the Yiddish language and Yiddish culture, including the structure of Yiddish, the history of the Yiddish language, Yiddish in America (the Yiddish revival, the role of the Yiddish press, etc.), Yiddish as a minority/dying language, and the influence of Yiddish on present-day American English. No previous knowledge of Yiddish required.]

[LING 242 Diversity in American English (III)
Spring. 3 credits. Not offered 2001–2002; next offered 2002–2003. C. Collins.
This course is a basic introduction to the regional dialects of English spoken in the United States. It is linguistically oriented, introducing the relevant aspects of phonetics, phonology, morphology, and syntax where appropriate. There is an emphasis on the students discovering what features characterize their own dialects (if they speak American English). The class is also of use as an introduction to American English dialects for nonnative speakers of English.]

[LING 244 Language and Gender (also WOMNS 244) (III)
Spring. 4 credits. For nonmajors or majors. Not offered 2001–2002. S. McConnell-Ginet.
This course explores connections between language (use) and gender/sex systems, addressing such questions as the following: How do sex and gender affect the ways we speak, the ways we interpret and evaluate speech? How do sociocultural differences in women's and men's roles affect their language use, their relation to language change? What is meant by sexist language? How does conversation structure the social worlds of women and men? Readings draw from work in linguistics, anthropology, philosophy, psychology, literature, and general women's studies and feminist theory.]

[LING 246/546 Minority Languages and Linguistics (III)
Not offered 2001–2002.]

[LING 251–252 Intermediate Sanskrit (also CLASS 251–252 and SANSK 251–252) @ #
Satisfies language proficiency. Not offered 2001–2002.
For description, see SANSK 251–252.]

[LING 264 Language, Mind, and Brain (also COGST 264) (III)
Spring. 4 credits. For nonmajors or majors. Prerequisite: a basic course in linguistics and/or psychology is desirable. Not offered 2001–2002. J. Bowers.
An introductory course that emphasizes the formal structure of natural language and its biological basis. The following topics are covered: the formal representation of linguistic knowledge, principles and parameters of universal grammar, the basic biology of language, mechanisms of linguistic performance, the modularity hypothesis, and language and cognition. This course is especially suited for majors in fields such as psychology, philosophy, computer science, and linguistics (and also for those enrolled in the concentration in cognitive studies) who want to take a one-semester introduction to linguistics that concentrates on the formal principles that govern linguistic knowledge, along with some discussion of their biological realization and their use in perception and production.]

[LING 270 Truth and Interpretation (also COGST 270 and PHIL 270) (III)
Not offered 2001–2002.
For description, see PHIL 270.]

[LING 285/585 Linguistic Theory and Poetic Structure (also ENGL 296/585) (III or IV)
Spring. 4 credits. Graduate students register under LING 585. Not offered 2001–2002. J. Bowers.
Poems are among the most highly structured linguistic objects that human beings produce. While some of the devices used in poetry are arbitrary and purely conventional, most are natural extensions of structural properties inherent in natural language itself. The aim of this course is to reveal the ways poetry is structured at every level, from rhyme to metaphor, and to show how certain results of modern linguistics can usefully be applied to the analysis and interpretation of poetry. After introducing some of the basic concepts of modern phonology, syntax, and semantics, it is shown how literary notions such as rhyme, meter, enjambment, and metaphor can be formally defined in linguistic terms. These results are then applied to the analysis of particular poems and shown to yield novel and interesting insights into both their structure and interpretation.]

LING 300 Field Methods (III)
Spring. 4 credits. Prerequisites: LING 201 and 203 or permission of instructor. C. Collins, J. Wolff.
Elicitation, recording, and analysis of data from a native speaker of a non-Western language not generally known to students.

LING 301–302 Phonology I, II (III)
301, fall; 302, spring. 4 credits each term. Prerequisites: for LING 301, LING 201 or equivalent; for LING 302, LING 301 or permission of instructor. Fall, A. Cohn; spring, D. Zec.
301 provides a basic introduction to phonological theory. The first half of the course focuses on basic principles of phonology, patterns of sounds, and their representations. In the second half, the nature of syllable structure and feature representations are explored. 302 provides further refinement of the issues investigated in 301, focusing in particular on metrical theory, Lexical Phonology, autosegmental phonology, and Prosodic Morphology.

LING 303–304 Syntax I, II (III)
303, fall; 304, spring. 4 credits each term. Prerequisites: for LING 303, LING 203; for LING 304, LING 303 or permission of instructor. Fall, C. Collins, J. Whitman; spring, M. Diesing.
303 is an introduction to syntactic theory, with emphasis on the classical theory of transformational grammar. 304 is an advanced course, surveying current syntactic models and dealing with such issues as the nature of syntactic representation, levels of representation, principles of universal grammar, and the relation of syntax and semantics.

[LING 308 Readings in Celtic Languages
Fall or spring, depending on demand. 2 credits. Prerequisite: permission of instructor. Not offered 2001–2002. W. Harbert.
Reading/discussion groups in Welsh or Scottish Gaelic.]

LING 309 Morphology (III)
Fall. 4 credits. Prerequisite: LING 101 or equivalent or permission of instructor. D. Zec.
This course addresses the basic issues in the study of words and their structures. It provides an introduction to different types of morphological structures with examples from a wide range of languages. Special emphasis is given to current theoretical approaches to morphological theory.

LING 311 The Structure of English: Demystifying English Grammar (also ENGL 313) (III or IV)
Fall. 4 credits. M. Suñer.
Do you suffer from grammatical insecurity? In foreign language classrooms, do you find yourself at a loss because you don't know how grammatical terminology applies to English? This course makes English grammar accessible and comprehensible to native speakers who want to understand how the language they use so easily works. In addition to standard grammatical notions, the course considers dialectal variation, matters of style, how sentence structure conveys viewpoint, and other discourse phenomena.

LING 314 Introduction to Historical Linguistics # (III)
Spring. 4 credits. Prerequisite: LING 201 or permission of instructor. M. Weiss.
A survey of the basic mechanisms of linguistic change, with examples from a variety of languages.

LING 315–316 Old Norse
315, fall; 316, spring. 4 credits each term. E. Johannsson.
Old Norse is a collective term for the earliest North Germanic literary languages: Old

Icelandic, Old Norwegian, Old Danish, and Old Swedish. The richly documented Old Icelandic is the center of attention, and the purpose is twofold: the students gain knowledge of an ancient North Germanic language, important from a linguistic point of view, and gain access to the medieval Icelandic (and Scandinavian) literature. 315: The structure of Old Norse (Old Icelandic), phonology, and morphology, with reading of selections from the Prose-Edda, a thirteenth-century narrative based on the Eddaic poetry. 316: Extensive reading of Old Norse texts, among them selections from some of the major Icelandic family sagas: Njals saga, Grettis saga, and Egils saga, as well as the whole Hrafnkels saga.

LING 319 Phonetics I (III)
Fall. 4 credits. Prerequisite: LING 201 or permission of instructor. A. Miller-Ockhuizen.

This course provides a basic introduction to the study of phonetics. Topics covered include anatomy and physiology of the speech production apparatus, transcription and production of some of the world's sounds, basic acoustics, computerized methods of speech analysis, acoustic characteristics of sounds, speech perception, speech synthesis, and stress and intonation.

LING 320 Phonetics II (III)
Spring. 4 credits. Prerequisite: LING 319. A. Miller-Ockhuizen.

This course is a continuation of Phonetics I and provides a more detailed survey of some areas in acoustic and articulatory phonetics. Topics include feature theory, vocal tract acoustics, quantal theory, speaker normalization, theories of speech perception, coarticulation, theories of speech production, and prosody. In addition, a number of "hands-on" projects are part of the course.

LING 321–[322] History of the Romance Languages (also ROMS 321) (III)
Fall; [322, spring]. 4 credits each term. Prerequisites: LING 101 or equivalent and qualification in any Romance language. Offered alternate years. C. Rosen.

321: Course covers: popular Latin; Pan-Romance trends in phonology, morphology, syntax, and the lexicon; regional divergence; non-Latin influences; and medieval diglossia and emergence of Romance standards. [322: French, Italian, and Spanish from 850 to 1250 A.D. Analysis of texts. Overview of other languages to the present day. Elements of dialectology.]

LING 323 Comparative Romance Syntax (also ROM S 323) (III)
Spring. 4 credits. Prerequisites: LING 101, or equivalent and qualification in any romance language. Offered alternate years. C. Rosen.

Concise survey of romance syntax, covering the salient constructions in six languages with equal attention to their historical evolution and their current state. Grammatical innovation and divergence in a typological perspective.

LING 325 Pragmatics (also PHIL 334) (III or IV)
Fall. 4 credits. Prerequisite: LING 201 or PHIL 231 or permission of instructor. D. Abusch.

An introduction to aspects of linguistic meaning which have to do with context and with the use of language. Topics include context change semantics and pragmatics, presupposition and accommodation, conversational implicature, speech acts, and the pragmatics of definite descriptions and quantifiers.

LING 332 Philosophy of Language (also PHIL 332) (IV)
For description, see PHIL 332.

[LING 333 Problems in Semantics (also PHIL 333 and COGST 333) (III or IV)
Spring. 4 credits. Prerequisite: logic or semantics course or permission of instructor. Not offered 2001–2002. S. McConnell-Ginet, Z. Gendler Szabó.

This course looks at problems in the semantic analysis of natural languages, critically examining work in linguistics and philosophy on particular topics of current interest. The focus is on quantification. Languages offer a variety of resources for expressing generalizations: some, every, no, many, and other quantifying expressions that appear inside noun phrases; always, never, occasionally, and other adverbial quantifying expressions not associated with particular nominals; constructional resources of various kinds (e.g., English free relatives like *whatever she cooks*). How different are these resources and what might they imply about basic cognitive and linguistic capacities?]

[LING 347 Topics in the History of English (III)
Spring. 4 credits. Prerequisite: LING 217, 314, a course in Old or Middle English, or permission of instructor. Not offered 2001–2002. W. Harbert.

The course will treat specific topics in the linguistic history of the English language, selected on the basis of the particular interests of the students and the instructor. The topic area for 2000–2001 was morphological and syntactic change during the Early Middle English period—a period crucial to the development of the distinctive syntactic properties of Modern English.]

[LING 355 Languages in Contact (III)
Fall. 4 credits. Prerequisite: LING 101. Not offered 2001–2002. J. Wolff.

A principal cause of language change is contact with another language—that is, when some speakers of the community speak another or several other languages. This course examines issues of how languages and also dialects in contact influence each other: what kind of changes they undergo and the social factors which determine the kind, direction, and degree of change. We study issues of multilingualism and its social correlates, code switching, issues of language mixture (pidginization and creolization, language intertwining), language maintenance and language death. Finally, we look at how issues of language in contact shape our understanding of traditional historical linguistics—that is, where languages that are now spoken in the world came from and how they came to be the way they are.]

LING 366 Spanish in the United States (also SPANR 366 and LSP 366) (III)
Fall. 4 credits. Prerequisite: some knowledge of Spanish. M. Suñer.

Examination of major Spanish dialects in the United States from a linguistic perspective. Contrast with the standard language. Borrowing, interference, and code switching. Syntactic, morphological, and phonological characteristics.

LING 390 Independent Study in Linguistics
Fall or spring. 1–4 credits variable. Prerequisite: LING 101 or permission of instructor. Staff.

Independent study of linguistics topics not covered in regular curriculum for undergrads.

LING 401 Language Typology (III)
Spring. 4 credits. Prerequisite: LING 101 or equivalent. C. Rosen.

Study of a basic question of contemporary linguistics: in what ways do languages differ, and in what ways are they all alike? Efforts to formalize universals of syntax and to characterize the total repertory of constructions available to natural languages. Common morphological devices and their syntactic correlates. Emphasis is on systems of case, agreement, and voice.

[LING 403 Applied Linguistics and Second Language Learning (III)
Fall. 4 credits. Prerequisite: at least one course in applied linguistics, linguistics, psychology, anthropology, communication, cognitive studies, education, or literary analysis; or permission of instructor. Not offered 2001–2002; next offered 2002–2003. Staff.

This course is an introduction to the field of applied linguistics with focus on different domains of language research as they come to bear on the matter of second language learning. Thus, topics include developmental and experimental psychology of language, textual and discourse analysis, literacy, cognitive consequences of bilingualism, corpora and language teaching, and contact between first and second language communities.]

[LING 404 Linguistic Structure of Japanese (also ASIAN 412) (III)
Fall. 4 credits. Prerequisites: JAPAN 102 or permission of instructor and LING 101 or equivalent introductory course in linguistics. Offered alternate years. Not offered 2001–2002; next offered 2002–2003. Y. Shirai.

Introduction to the linguistic study of Japanese, with an emphasis on morphology and syntax.]

LING 405 Sociolinguistics (III)
Fall. 4 credits. Prerequisite: LING 101 or permission of instructor. J. Wolff.

The principal work of linguistics is to describe, analyze, and understand the regularities of language systems. How, then, are we to deal with irregularities and variability when they are observed in language? This course introduces and discusses the most significant issues in the study of language variation, and it examines some of the methodologies that have been developed to study variation in language use. We consider the observable interactions between linguistic variables and social factors (e.g., age, sex, ethnicity) and review the main generalizations about these factors that sociolinguistics has arrived at in the last three decades. Some of the problems associated with the quantification and measurement of nonlinguistic variables are discussed and we evaluate the various ways researchers have dealt with these problems.

[LING 406 Ethnolinguistics (III)
Spring. 4 credits. Prerequisite: LING 101 or permission of instructor. Not offered 2001–2002; next offered 2002–2003. J. Wolff.

This course is an introduction to the study of pidgin and creole languages and the issues surrounding them both in and beyond linguistics. Topics covered include: genesis of pidgins and creoles; classification of pidgins and creoles; creoles and language universals; creoles and sociolinguistic variation; a module on Saramaccan Creole English; educational and language planning issues; sociohistorical issues; Black English.]

[LING 407 Grammatical Structure of Spanish I (also SPANR 407) (III)
Spring. 4 credits. Prerequisite: proficiency in Spanish or permission of instructor. Not offered 2001–2002; next offered 2002–2003. M. Suñer.
This course seeks to equip the advanced student or the future language professional with practical insights into problem areas for foreign language learners with the aid of linguistic descriptions. The intent is to narrow the gap known to exist between the knowledge that a native speaker has and the incomplete one that a foreign language learner possesses.]

[LING 408 Grammatical Structure of Spanish II (also SPANR 408) (III)
Spring. 4 credits. Prerequisites: LING 101 and proficiency in Spanish or permission of instructor. Offered alternate years. Not offered 2001–2002; next offered 2003–2004. M. Suñer.
Survey of Spanish morpho-syntax using contemporary theoretical models to highlight hidden patterns and generalizations. Topics may vary according to students' interests, but may include major clause types, word order possibilities, negation, agreement, and null categories.]

[LING 409 Structure of Italian (III)
Fall. 4 credits. Prerequisites: LING 101 or equivalent and qualification in any Romance language. Offered alternate years. Not offered 2001–2002; next offered 2002–2003. C. Rosen.
Survey of Italian syntax, using simple theoretical tools to bring hidden regularities to light. Topics include auxiliaries, modals, clitics, reflexive constructions, agreement, impersonal constructions, causatives.]

[LING 410 History of the Italian Language (III)
Spring. 4 credits. Prerequisites: LING 321 and either ITAL 201, 203, or equivalent. Offered alternate years. Not offered 2001–2002; next offered 2002–2003. C. Rosen.
Overview of Italian and its dialects from the earliest texts to the present day. Emergence of the standard language. External history and sociolinguistic circumstances.]

LING 411 History of the Japanese Language (also ASIAN 411) @ (III)
Fall. 4 credits. Prerequisite: permission of instructor. Offered alternate years. J. Whitman.
An overview of the history of the Japanese language followed by intensive examination of issues of interest to the participants. Students should have a reading knowledge of Japanese.

[LING 413 Topics in Historical Linguistics
Fall. 4 credits. Prerequisite: LING 314 or permission of instructor. Not offered 2001–2002. W. Harbert, C. Rosen.
Examines a selection of recent research illustrating a variety of productive and innovative approaches to problems in historical linguistics. Readings center on phonological and morphological evolution in the Romance and Germanic families. Students carry out guided research projects.]

LING 414 Second Language Acquisition I (also ASIAN 414) (III)
Spring. 4 credits. Prerequisite: permission of instructor. Y. Shirai.
A survey of the quantitative and qualitative research literature on the acquisition of second and additional languages among the adult population. Research carried out in both experimental and natural settings is considered. Topics include: learner errors and errors analysis; contrastive analysis hypothesis; developmental and variability patterns in the acquisition of syntax, phonology and morphology, including the potential effects of typological and formal universals; pragmatics and discourse; the lexicon, social and cognitive factors in acquisition, communication, and learning strategies; theories of second language acquisition.

[LING 415 Second Language Acquisition II (also ASIAN 417) (III)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002; next offered 2002–2003. Y. Shirai.
This course examines various issues in second language acquisition research that is particularly relevant to foreign language teaching and learning. Topics covered include: the role of input (listening/reading) vs. output (speaking/writing); implicit vs. explicit learning; negative vs. positive evidence (including the role of error correction); affective factors (motivation, anxiety); individual differences; teachability hypothesis and syllabus construction; the structure of second language proficiency.]

[LING 416 Structure of the Arabic Language (also NES 416) @ (III)
Not offered 2001–2002.
For description, see NES 416.]

[LING 417–418 History of the Russian Language (also RUSSA 401–402) (III)
417, fall; 418, spring. 4 credits each term. Prerequisites: for LING 417, permission of instructor; for LING 418, LING 417 or equivalent. Offered alternate years. Not offered 2001–2002; next offered 2003–2004. W. Browne.
Phonological, morphological, and syntactic developments from Old Russian to modern Russian.]

[LING 420 Approaches to Discourse (also ASIAN 419 and COM L 421) (III or IV)
Not offered 2001–2002.]

LING 421–422 Semantics I, II (III)
421, spring; 422, fall. 4 credits each term. Prerequisites: for LING 421, LING 203; for LING 422, LING 421 or permission of instructor. D. Abusch.
421: An introduction to semantics of natural language. The course starts from basic foundational questions concerning the nature of meaning and the empirical domain of semantic theory. Truth-conditional and logical theories and their application to the investigation of the structure of natural languages are extensively explored (with some comparisons with other approaches). Through the study of quantification, scope, anaphora, modalities, presuppositions, and the like, one tries to gain insight into general characteristics of the cognitive apparatus that is at the basis of our capacity for understanding sentences.

422: Guides students into current work in semantic theory. The first half of the course is an introduction to Montague-style semantics, whose influence on current research is quite extensive. The second half of the course focuses on selected topics that have grown out of (and sometimes against) classical Montague semantics. Such topics are usually drawn from the following: generalized quantifiers and anaphora, type-shifting, problems of tense and aspect, the linguistic relevance of algebraic approaches to properties, propositions, events and thematic roles, and discourse representation theory.

LING 424 Computational Linguistics (also COGST 424 and COM S 424) (III)
Spring. 4 credits. Prerequisite: LING 203 or permission of instructor; COM S 114 is also recommended. M. Rooth.
Steady progress in formalisms, algorithms, linguistic knowledge, and computer technology is bringing computational mastery of the syntax, morphology, and phonology of natural languages within reach. The course introduces methods for "doing a language" computationally, with an emphasis on approaches which combine linguistic knowledge with powerful computational formalisms. Topics: computational grammars, parsing, representation of syntactic analyses; finite state morphology; weighted grammars; feature constraint formalisms for syntax; treebank and other markup methodology; robust low-level syntax and semantics; and experimental-modeling methodology using large data samples.

[LING 425 Corpora and Applied Linguistics (also ASIAN 425) (III)
Not offered 2001–2002.]

[LING 427 Structure of Hungarian (III)
Fall. 4 credits. Prerequisite: LING 101 or equivalent. Offered alternate years. Not offered 2001–2002; next offered 2003–2004. W. Browne.
Survey of phonology, morphology, and syntax of this non-Indo-European language. Topics to be stressed include vowel harmony, consonant assimilation; definite and indefinite conjugations, possessives, verb prefixes, causatives; and focus, word order, clause types, movement, intonation.]

[LING 429 Structure of the Chinese Language (also ASIAN 429) (III)
Not offered 2001–2002.]

LING 430 Structure of Korean (also ASIAN 430) (III)
Spring. 4 credits. Offered alternate years. J. Whitman.
Intensive examination of the syntax and phonology of a non-Indo-European language with the objective of testing principles of current linguistic theory. No previous knowledge of Korean required.

[LING 431 Structure of an African Language (III)
Spring. 4 credits. Prerequisite: LING 101 or permission of the instructor. Offered alternate years. Not offered 2001–2002; next offered 2002–2003. C. Collins.
A survey of the grammar of an African language in light of current linguistic theory.]

LING 433 The Lesser-Known Romance Languages (also ROM S 433)
Fall. 4 credits. Prerequisites: LING 101 or equivalent and qualification in any Romance language. C. Rosen.
The course surveys three or four Romance languages or dialects, examining their sound systems, grammars, and historical evolution from Latin. Includes some native speaker demonstrations. Readings represent both the modern languages and their earliest attested stages. Topics for fall 2001: Catalan, Romanian, a Northern Italian dialect, and a Rheto-Romance language.

LING 436 Language Development (also COGST 436, HD 436, and PSYCH 436) (III)
Spring. 4 credits. Open to undergraduate and graduate students. Graduate students should also enroll in HD 633/LING 700/PSYCH 600, a supplemental graduate seminar. Prerequisite: at least 1 course in developmental psychology, cognitive psychology, cognitive development, biology, neurobiology, or linguistics. B. Lust.
This course surveys basic issues, methods, and research in the study of first-language acquisition. Major theoretical positions in the field are considered in light of experimental studies in first-language acquisition of phonology, syntax, and semantics from infancy on. The fundamental issues of relationships between language and thought are discussed, as are the fundamental linguistic issues of Universal Grammar and the biological foundations for language acquisition. The acquisition of communication systems in nonhuman species such as chimpanzees is addressed, but major emphasis is on the child. An optional lab course supplement is available (see COGST 450/LING 450/PSYCH 437).

[LING 437 Celtic Linguistic Structures (III)
Spring. 4 credits. Prerequisite: LING 303. Not offered 2001–2002; next offered 2002–2003. W. Harbert.
This course treats selected topics in the syntax and morphosyntax of the modern Celtic languages.]

LING 441 Introduction to Germanic Linguistics (also GERST 441) (III)
Fall. 4 credits. Prerequisite: LING 101 or permission of instructor. W. Harbert.
Survey of major issues in historical Germanic linguistics.

[LING 443–444 Linguistic Structure of Russian (also RUSSA 403–404) (III)
443, fall; 444, spring. 4 credits each term. Prerequisites: for LING 443, LING 101 and permission of instructor; for LING 444, LING 443 or equivalent. Offered alternate years; next offered 2003–2004. W. Browne.
A synchronic analysis of the structure of modern Russian. LING 443 deals primarily with phonology and its relation to syntax and 444 with syntax and word order. Topics covered include case theory, the functions of word order, voice, agreement, impersonal constructions, negation, nonuniversal categories, and the relation between morphology and syntax.]

LING 450 Lab Course: Language Development (also COGST 450 and PSYCH 437)
Spring. 2 credits. Prerequisite: COGST/HD/LING/PSYCH 436. B. Lust.
This laboratory course provides undergraduates with an introduction to hands-on research experience in the Cognitive Studies research labs and meets once a week in group format. It includes several structured modules dealing with topics covered in the survey course, COGST/HD/LING/PSYCH 436, Language Development. They include training in how to study and analyze original child language data, including the use of selected portions of a large database of child language data from many languages in the Cornell Language Acquisition Lab (CLAL), and training necessary to the collection and analysis of new child language data. Emphasis is placed on developing research methods in order to test hypotheses.

[LING 451 Greek Comparative Grammar (also CLASS 421) (III)
Fall. 4 credits. Prerequisite: thorough familiarity with classical Greek morphology. Not offered 2001–2002; next offered 2003–2004. A. Nussbaum.
The prehistory and evolution of the sounds and forms of ancient Greek as reconstructed by comparison with the other Indo-European languages.]

LING 452 Latin Comparative Grammar (also CLASS 422) (III)
Fall. 4 credits. Prerequisite: thorough familiarity with classical Latin morphology. A. Nussbaum.
The prehistory and evolution of the sounds and forms of classical Latin as reconstructed by comparison with the other Indo-European languages.

[LING 454 Italic Dialects (also CLASS 424) (III)
Fall. 4 credits. Prerequisite: thorough familiarity with classical Latin morphology. Not offered 2001–2002; next offered 2002–2003. A. Nussbaum.
The phonology and morphology of Faliscan, Oscan, and Umbrian studied through the reading of epigraphical texts. Attention to the relations of these languages to Latin and the question of proto-Italic.]

[LING 455 Greek Dialects (also CLASS 425) (III)
Fall. 4 credits. Prerequisite: basic familiarity with classical Greek morphology. Not offered 2001–2002; next offered 2003–2004. A. Nussbaum.
A survey of the dialects of ancient Greek through the reading and analysis of representative epigraphical and literary texts.]

LING 456 Archaic Latin (also CLASS 426) (III)
Spring. 4 credits. Prerequisite: reading knowledge of Latin. A. Nussbaum.
Reading of epigraphic and literary preclassical texts with special attention to archaic and dialectal features. The position of Latin among the Indo-European languages of ancient Italy, the rudiments of Latin historical grammar, and aspects of the development of the literary language.

[LING 457 Homeric Philology (also CLASS 427) (III)
Spring. 4 credits. Prerequisite: ability to read Homeric Greek. Not offered 2001–2002; next offered 2002–2003. A. Nussbaum.
The language of the Homeric epics: dialect background, archaisms, modernizations. The notion of a Kunstsprache: its constitution, use, and internal consistency. The phonological and morphological aspects of epic compositional technique.]

[LING 459 Mycenaean Greek (also CLASS 429) (III)
4 credits. Prerequisite: thorough familiarity with classical Greek morphology. Not offered 2001–2002; next offered 2003–2004. A. Nussbaum.
An introduction to the epigraphy, language, and content of the Linear B tablets with special attention to their implications for Greek historical grammar and dialectology.]

[LING 460 Sanskrit Comparative Grammar (III or IV)
Spring. 4 credits. Prerequisite: reasonable familiarity with classical Sanskrit morphology. Not offered 2001–2002; next offered 2003–2004. A. Nussbaum.
A survey of the historical phonology and morphology of Sanskrit in relation to the Indo-Iranian and Indo-European comparative evidence.]

LING 474 Introduction to Natural Language Processing (also COGST 474 and COMS 474) (III)
For description, see COMS 474.

LING 493 Honors Thesis Research
Fall. 4 credits. Staff.
May be taken before or after LING 494, or may be taken independently.

LING 494 Honors Thesis Research
Spring. 4 credits. Staff.
May be taken as a continuation of, or before, LING 493.

[LING 601 Topics in Phonological Theory
Fall. 4 credits variable. Prerequisites: LING 301 and 1 higher-level course in phonology. Not offered 2001–2002. D. Zec.
Selected topics in current phonological theory.]

[LING 602 Topics in Morphology
Fall. 4 credits. Prerequisites: LING 301 or 303 or permission of instructor. Not offered 2001–2002. D. Zec.
Selected topics in current morphological theory.]

LING 604 Research Workshop
Fall. 2 credits. S-U grade only. Required of third-year linguistics graduate students. A. Cohn.
This course provides a forum for presentation and discussion of ongoing research, and development of professional skills. Participants must enroll in a concurrent independent study with a special committee member, or a relevant workshop.

[LING 606 Historical Syntax
Fall. 4 credits. Prerequisite: LING 303. Not offered 2001–2002. C. Rosen.
A course on change in language structure, beginning with an overview of widely attested types of syntactic change and proceeding to an introduction of current theoretical treatments. Topics covered include grammaticalization, word order change, and

the interplay between morphological and syntactic change. Assumes a basic background in syntax.]

[LING 608 Discourse Analysis (also COM L 618)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. H. Tao.
Linguistic theory applied to relationships beyond the sentence.]

[LING 609 SLA and the Asian Languages (also ASIAN 610)
Fall. 4 credits. Prerequisite: LING 414–415 or permission of instructor. Not offered 2001–2002. Y. Shirai.
This course surveys the literature on the acquisition of Asian languages both in first and second language. We mainly focus on Japanese, Korean, Chinese (Mandarin/Cantonese), but other languages (Thai, Malay, Vietnamese, Burmese, Tagalog, etc.) may be dealt with, depending on faculty/student interest.]

LING 616 Topics in Syntactic Theory
Fall. 4 credits variable. Prerequisite: LING 304 or permission of instructor. M. Diesing.
An examination of recent developments in syntactic theory, including "minimalist" approaches to phrase structure, derivations/representations and the nature of economy conditions, and parametric differences.

[LING 617–618 Hittite
617, fall; 618, spring. 4 credits each term. Prerequisites: for LING 617, permission of instructor; for LING 618, LING 617 or permission of instructor. Not offered 2001–2002. Staff.
An introduction to the cuneiform writing system and the grammar of Hittite, followed by the reading of selected texts.]

[LING 619 Rigveda
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. C. Minkowski.
Reading and linguistic analysis of selected Vedic hymns.]

LING 620 Comparative Grammar of Anatolian (also NES 623)
Spring. 4 credits. Prerequisite: LING 617. M. Weiss.
Introduction to the historical phonology and morphology of the Anatolian languages. Knowledge of Hittite and Luvian recommended but not required.

[LING 621 Avestan and Old Persian (also NES 621)
Fall. 4 credits. Prerequisite: a basic knowledge of Sanskrit forms and morphology syntax. Not offered 2001–2002. M. Weiss.
Linguistically-oriented readings of Old Persian and Avestan.]

[LING 623–624 Old Irish I, II
623, fall; 624, spring. 4 credits each term. Prerequisite for LING 624: LING 623 or permission of instructor. Not offered 2001–2002. Staff.
An introduction to "classical" Old Irish for students with no previous experience with the language.]

[LING 625 Middle Welsh
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. W. Harbert.
Students develop a reading knowledge of Middle Welsh through translating selections from prose and poetry. Emphasis is on the prose tales, including the Mabinogi. No familiarity with Welsh is assumed.]

[LING 627 Advanced Old Irish]

LING 629 Old Avestan (also NES 622)
Fall. 4 credits. Prerequisite: LING 621. M. Weiss.
Linguistically and philologically oriented reading of the Gathas of Zarathustra and the Yasna Haptanhaiti. Some knowledge of Sanskrit required.

[LING 631 Comparative Indo-European Linguistics
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. Staff.
An introduction to the comparative grammar of the Indo-European languages.]

LING 633 Language Acquisition Seminar (also COGST 633 and HD 633)
Fall. 1–4 credits. Prerequisite: LING 436 or equivalent or permission of instructor. B. Lust.
This seminar reviews and critiques current theoretical and experimental studies of first-language acquisition, with a concentration on insights gained by cross-linguistic study of this area. Attention is also given to the development of research proposals.

[LING 635–636 Indo-European Workshop
635, fall; 636, spring. 4 credits each term. Prerequisite: permission of instructor. Not offered 2001–2002. M. Weiss.
An assortment of subjects intended for students with previous training in Indo-European linguistics: problems in the reconstruction of Proto Indo-European, topics in the historical grammars of the various IE languages, reading and historical linguistic analysis of texts, and grammatical sketches of "minor" IE languages.]

[LING 643 Topics in Historical Germanic Phonology
Spring. 4 credits. Prerequisite: LING 441. Not offered 2001–2002. W. Harbert.
The development of the sound system from Proto-Germanic to its daughter languages.]

[LING 644 Topics in Historical Germanic Syntax
Fall. 4 credits. Prerequisite: LING 441. Not offered 2001–2002. W. Harbert.
A diachronic and comparative investigation of syntactic processes in the older Germanic languages.]

[LING 645 Gothic
Spring. 4 credits. Prerequisite: LING 101. Offered alternate years. Not offered 2001–2002. W. Harbert.
Linguistic structure of Gothic, with extensive readings of Gothic texts.]

[LING 646 Old High German, Old Saxon (also GERST 658)
Spring. 4 credits. Prerequisite: LING 101. Offered alternate years. Not offered 2001–2002. W. Harbert.
This course combines a survey of the linguistic history and structure of Old High German and Old Saxon with extensive readings from the major documents in which they are recorded. Reading knowledge of Modern German is highly recommended.]

[LING 648 Speech Synthesis by Rule
Spring. 4 credits. Prerequisite: LING 301, 319, or permission of instructor. Offered alternate years. Not offered 2001–2002; next offered 2002–2003. S. Hertz.
Investigates the nature of the acoustic structure of speech synthesis, using speech as a tool for exploring this structure. A particular acoustic model is proposed, developed, and motivated by considering the relationship between phonological and acoustic structure, speech timing, phonetic universals, coarticulation, and speech perception. The primary tool for investigation will be the Delta System, a powerful software system for investigating phonology and phonetics through speech synthesis. The course is meant for graduate students and advanced undergraduate students in linguistics, but may also be of interest to students in psychology/psycholinguistics, computer science, and cognitive studies.]

[LING 649 Structure of Old English
Spring. 4 credits. Prerequisite: LING 441. Offered alternate years. Not offered 2001–2002. W. Harbert.
Linguistic overview of Old English, with emphasis on phonology and syntax.]

[LING 653–654 Seminar in Southeast Asian Linguistics
653, fall; 654, spring. 4 credits each term. Prerequisite: LING 303 or permission of instructor. LING 653 is not a prerequisite for 654. Not offered 2001–2002. J. Wolff.
Languages of mainland Southeast Asia. Topics, chosen according to student interests, may include description, dialectology, typology, comparative reconstruction, and historical studies.]

[LING 655–656 Seminar in Austronesian Linguistics
655, fall; 656, spring. 4 credits each term. Prerequisites: for LING 655, LING 101 and permission of instructor; for LING 656, LING 655. Not offered 2001–2002. J. Wolff.
Descriptive and comparative studies of Malayo-Polynesian languages.]

[LING 659 Seminar in Vedic Philology (also ASIAN 659 and CLASS 659)
Not offered 2001–2002.
For description, see ASIAN 659.]

LING 661 Old Church Slavonic (also RUSSA 601)
Fall. 4 credits. Prerequisite: students must know a Slavic or Indo-European language. This course is prerequisite to LING 662 and LING 671. Offered alternate years. W. Browne.
Grammar and reading of basic texts.

LING 662 Old Russian Texts (also RUSSA 602)
Spring. 4 credits. Prerequisite: LING 661. Offered alternate years. W. Browne.
Grammatical analysis and close reading of Old Russian texts.

LING 671–[672] Comparative Slavic Linguistics (also RUSSA 651–652)
671, fall; [672, spring]. 4 credits each term. Prerequisites: for LING 672, LING 661 taken previously or simultaneously or permission of instructor. Offered alternate years. W. Browne.
Sounds and forms of the Slavic languages and of prehistoric common Slavic; main historical developments leading to the modern languages.

LING 700 Seminar
Fall or spring, according to demand. Credit to be arranged.
Seminars are offered according to faculty interest and student demand. Topics in recent years have included subject and topic, Montague grammar, speech synthesis, lexicography, classical and autonomous phonology, Japanese sociolinguistics, relational grammar, semantics and semiotics, and others.

LING 701–702 Directed Research
701, fall; 702, spring. 1–4 credits. Hours to be arranged. Staff.

[LING 773–774 Proseminar In Cognitive Studies I, II (also COGST 773–774, COM S 773–774, PHIL 773–774, PSYCH 773–774)
Fall: R grade; spring: S-U only. 4 credits. Not offered 2001–2002. Staff.
This year-long seminar is intended to provide graduate students with an interdisciplinary introduction to the study of knowledge, its representation, acquisition, and use.]

MATHEMATICS

www.math.cornell.edu

J. Smillie, chair; A. Back, G. Bailey, D. Barbasch, Y. Berest, L. Billera (DGS), K. Brown, K.-U. Bux, S. Chase, M. Cohen, J. Conant, R. Connelly, R. K. Dennis, M. Dindos, R. Durrett, E. Dynkin, C. Earle, J. Escobar, M. Fickus, L. Gross, J. Guckenheimer, A. Hatcher, D. Henderson, J. Hubbard, J. Hwang, Y. Ilyashenko, P. Kahn, H. Kesten, G. Lawler, V. Limic, R. Miller, I. Mitrea, M. Morley, A. Nerode, M. Nussbaum, I. Peeva, R. Platek, R. Ramakrishna, J. Ramirez, O. Rothaus, K. Rybnikov, L. Saloff-Coste, A. Schatz, J. Schweinsberg, S. Sen, R. A. Shore, R. Sjamaar, L. Smithline, A. Solomon, B. Speh (DUS), M. E. Stillman, R. Strichartz, E. Swartz, M. Terrell, R. Terrell, H. Tsai, W. Tucker, A. Vladimirsky, K. Vogtmann, L. Wahlbin, B. H. West, J. West, M. Yakimov, (Emeritus: J. Bramble, R. Farrell, G. R. Livesay, L. E. Payne, A. Rosenberg, M. Sweedler)

Mathematics is the language of modern science; basic training in the discipline is essential for those who want to understand, as well as for those who want to take part in, the important scientific developments of our time. Acquaintance with mathematics is also extremely useful for students in the social sciences and valuable for anyone interested in the full range of human culture and the ways of knowing the universe in which we live.

The Department of Mathematics faculty has strong groups specializing in algebra, number theory, combinatorics, real and complex analysis, Lie groups, topology and geometry, logic, probability and statistics, mathematical physics, and applied mathematics. Related departments at Cornell have specialists in computer science, operations research, linear programming, and game theory, and courses in these topics can be integrated readily into the mathematics major.

The department offers a rich variety of undergraduate courses, and many of its beginning graduate courses are suitable for advanced undergraduates as well. Under some conditions, a student may carry out an independent reading and research project for college credit under the supervision of a faculty member.

Members of the department are available to discuss with students the appropriate course for their levels of ability and interest, and students are urged to avail themselves of this help.

Students who want to take any of the courses numbered 300 or above are invited to confer, before registering, with the instructor concerned. The level of a course is indicated by the first digit of the course number: roughly, 1, 2, indicate underclass courses; 3, 4, upperclass courses; 5, professional level and mathematics education courses; 6, 7, graduate courses. The subject matter of courses is often indicated by the second digit: 0, general; 1, 2, analysis; 3, 4, algebra and combinatorics; 5, 6, topology and geometry; 7, probability and statistics; 8, logic; 9, other.

Midterm grades, when required, will be S or U only, except in special circumstances. In courses with numbers below 700, students will receive letter grades, with the exception of nonmathematics majors who have requested an S-U grade.

Advanced Placement

Secondary school students are strongly urged to take one of the two advanced placement examinations of the College Entrance Examination Board in their senior year. Freshmen who have had some calculus but who have not taken an advanced placement examination should take the placement examination in mathematics offered at Cornell just before the beginning of classes in the fall. It is most important that anyone with any knowledge of calculus carefully read "Advanced Placement," p. 6, 7.

The Major

The mathematics major adapts to a number of purposes. It can emphasize the theoretical or the applied. It can be appropriate for professionals and nonprofessionals alike, and can be broad or narrow. It can also be combined easily with serious study in another subject in the physical, biological, or social sciences by means of a double major and/or concentration. For example, a double major in mathematics and computer science is facilitated by the concentration in computer science (requirement 4, option b) described below. This concentration permits a student to use certain computer science courses to satisfy the requirements of both majors. Questions concerning the major should be brought to a departmental representative.

Prerequisites

The traditional prerequisites are MATH 221–222, 223–224, or 293–294. A unit on infinite series is required. Such a unit is offered in MATH 112, 122 and 192. Normally students will be admitted to the major only when they have grades of B– or better in all 200-level mathematics courses taken. Alternative prerequisites are MATH 213 and 231, normally with grades of B+ or better.

Requirements

There are five requirements for the major:

1. COM S 100. Students are urged to take this course before the end of their sophomore year.
2. Two courses in algebra. Eligible courses are MATH 336 or 436, 431 or 433, 332 or 432 or 434.
3. Two courses in analysis. Eligible courses are MATH 311, 321, 411 or 413, 414, 418, 420, 422, 423, 424, 425, 427, 428. (MATH 411 has been discontinued and replaced by MATH 311. Students may not receive credit for MATH 311 if they have received credit for MATH 411. MATH 423 will not be offered again.)
4. Further high-level mathematical courses. Any one of (a), (b), (c), (d), (e) below is sufficient. The five alternatives below do not exhaust the possibilities. A mathematics major interested in a concentration in a subject different from those below may develop a suitable individual program in consultation with his/her major adviser.

   (a) Four additional Mathematics courses numbered 300 or above

   (b) **Concentration in Computer Science:** Five additional courses from (i) and (ii) below, of which at least one is from (i) and three are from (ii)

      (i) Mathematics courses numbered 300 or above

      (ii) Computer Science courses numbered 300 or above

   (c) **Concentration in Operations Research:** Five additional courses from (iii) and (iv) below, of which at least one is from (iii) and three are from (iv)

      (iii) Mathematics courses numbered 300 or above

      (iv) Courses in Operations Research and Industrial Engineering in which the primary focus involves mathematical techniques. Undergraduate courses include OR&IE 320–462 excluding OR&IE 350, 414, and 416. Many Operations Research graduate courses are also allowed. Students should consult with their advisers.

   (d) **Concentration in Economics:** Five additional courses from (v), (vi), and (vii) below, as follows: one course from (v), three courses from (vi), and a fifth course from any of (v), (vi), or (vii). However, Mathematics 472 and Economics 319 cannot **both** be used to satisfy these requirements.

      (v) Mathematics courses numbered 300 or above

      (vi) Economics courses with significant mathematical content. Eligible courses are ECON 318, 319, 320, 416, 419, 450 (also ARME 450), 467, 609, 610, 613, 614, 619, 620, 717, 756.

      (vii) Courses in Operations Research with significant mathematical content and dealing with material of interest in economics; e.g., OR&IE 320, 321, 432, 435, and the sequence 475–476. However, the student may, with the adviser's approval, select an OR&IE course that satisfies the basic

intent of the requirement but is not in this list.

(e) **Concentration in Mathematical Physics:** Five additional courses from (viii) and (ix) below, of which at least one is from (viii) and three are from (ix).

(viii) Mathematics courses at the highest undergraduate level in analysis, geometry, algebra and combinatorics, probability and statistics, and mathematical logic. Eligible courses are MATH 401, 411 or 413, 414, 420, 418 or 422, 423, 424, 425, 427, 428, 431 or 433, 432 or 434, 436, 441, 442, 451, 452, 453, 454, 455, 471, 472, 474, 481, 482, 483, 486. (MATH 411 and 423 will not be offered again.)

(ix) Physics courses that make significant use of advanced mathematics. Eligible courses are PHYS 316, 317, 318, 327, 341, 443, 444, 454, 455, 480.

5. One course dealing with mathematical models. Any course from outside mathematics with serious mathematical content and dealing with scientific matters. *This course cannot be used to satisfy any of the other requirements for the major.* Serious mathematical content includes, but is not limited to, extensive use of calculus or linear algebra. Even if the Physics concentration has been selected, PHYS 116, 208, 213, or 217 may be used to satisfy the modeling requirement, but no other 100-level Physics course, nor PHYS 207 or 209 may be used. COM S 211 satisfies the modeling requirement provided the Computer Science concentration has **not** been selected. Any course from another department that would satisfy one of the concentrations requirements may be used to fulfill the modeling requirement, provided the course is not also used to fulfill the concentration requirement. Some courses in biology, chemistry and other fields can fulfill the modeling requirement. Students should consult with their advisers.

A course may be counted toward the mathematics major only if a grade of C– or better is received for that course.

Major advisers can alter these requirements upon request from an advisee, provided the intent of the requirements is met.

Honors Program

The Department of Mathematics awards honors (cum laude) and high honors (magna cum laude and summa cum laude) to graduating mathematics majors who have demonstrated outstanding ability in the major program.

The awards are determined by the Mathematics Major Committee in the latter part of the semester prior to graduation. Normally, one requirement for honors is participation in the Honors Seminar (Math 401) for one semester, or independent study at a high performance level. The committee will also be looking for excellent performance in mathematics courses, particularly in challenging courses at the 400 level or beyond. Students interested in honors should consult their major advisers concerning suitable courses.

To be considered for high honors, a student usually will be expected to write a Senior Thesis and present it orally. This project is carried out during the senior year under the supervision of a member of the Mathematics Department faculty. Students interested in high honors should consult their major advisers and the chair of the department's Mathematics Major Committee during the second semester of their junior year.

Teacher Education in Mathematics

Students at Cornell may pursue teaching credentials in biology, chemistry, earth science, general science, mathematics, and physics. TEAMS (Teacher Education in Agriculture, Mathematics, and Science) is a university program jointly conducted by the departments of Education and Mathematics. Most TEAMS students enroll in a five-year program, which combines an undergraduate major in mathematics or one of the sciences with a one-year Master of Arts in Teaching (MAT). Students from any college at Cornell are eligible to apply to the program as undergraduates. Students completing the graduate program will earn the master's degree required for permanent certification in New York and most other states.

Mathematics students in TEAMS must complete all the requirements for a mathematics major (or its equivalent) including MATH 403, 408, 451, 507, and a probability/statistics course. There are a number of education courses required including EDUC 402, 403, 601, 602, 644 plus 2–3 additional courses. Some of the required courses will be taken in the graduate fifth year.

For more information, contact the TEAMS Student Support Specialist at 255–9255 or Avery Solomon (Mathematics, aps5@cornell.edu), or David Henderson (Mathematics, dwh2@cornell.edu).

Studying Mathematics Outside the Major

The College of Arts and Sciences and the Department of Mathematics offer no minor in mathematics; however, some other scientific departments in the college offer, within their own majors, concentrations in mathematics and mathematics-related fields. A student interested in such a concentration should consult the Director of Undergraduate Studies of his/her major department.

The Engineering College offers a minor in applied mathematics that is open to any undergraduate in that college. The minor is sponsored jointly by the Department of Mathematics and the Department of Theoretical and Applied Mechanics, and is administered by the latter department. Engineering students interested in this minor should contact Professor Richard Rand of the Department of Theoretical and Applied Mechanics (255–7145; rhr2@cornell.edu). Information about the minor is also available at www.math.cornell.edu.

The Mathematics Department welcomes into its upper-level courses students from all colleges, schools, and departments at Cornell. In particular, undergraduates who wish to pursue serious study of mathematics, whether within or to complement their own major fields, are encouraged to consult with the department. The department's Director of Undergraduate Studies and other faculty can provide assistance in selecting appropriate areas of study and individual courses.

Distribution Requirement

The mathematics courses that can be used to satisfy the Group II (Quantitative and Formal Reasoning) part of the Arts College distribution requirements are indicated by the symbol "(II)" next to the title of the course.

Basic Sequences

Precalculus

Description	*Courses*
1) Algebra and trigonometry to prepare students for calculus	MATH 109* or EDUC 005*
2) Algebra, analytic geometry, elements of calculus	EDUC 115**

*MATH 109 and EDUC 005 do not carry credit for graduation.

**Students who want a second semester of mathematics after EDUC 115 may take MATH 105 or, if they need more calculus, MATH 106 or 111.

Calculus

Description	*Mathematics Courses*
1) Standard three-semester sequence for students who do not expect to take advanced courses in mathematics	111–112–213
2) Calculus for engineers (also taken by some physical science majors)	190/191–192–293–294

3) Prospective mathematics majors and others who expect to take advanced courses in mathematics: many sequences are possible. For example, 111–112–221–222; or 121–122–221–222; or 121–122–223–224; or the engineering sequence 190/191–192–293–294; or a mix of the above. There is no specifically "approved" basic sequence for mathematics majors. Students should consult with their advisers for each individual case.

MATH 190 or 191 may be substituted for 111 in sequences 1 and 3. Sequences 2 and 3 are two-year sequences that include some linear algebra.

Students who take sequence 1 may learn some linear algebra by taking Mathematics 231. A student whose performance in 112 is excellent may switch to sequence 3 and take 221.

Special-Purpose Sequences

Description	*Mathematics Courses*
1) Finite mathematics and calculus for life and social science majors	105–106
2) Other possible finite mathematics and calculus sequence	105–111
3) Calculus and statistics sequences	106–171 111–171

Students who want to take two semesters of calculus are advised to take the first two

semesters of one of the three calculus sequences. Students with excellent performance in MATH 106 may follow that course with MATH 112 or 122. The courses in each of the calculus and statistics sequences may be taken in either order, since no calculus background is required for MATH 171. Each of the sequences listed here satisfies the mathematics requirement for most medical schools.

Switching between calculus sequences is often difficult, especially at the 200 level. Students should not attempt such a switch without consulting the Director of Undergraduate Studies.

Courses with Overlapping Content

Because the department offers many courses with overlapping content, students must choose their courses carefully to ensure that they will receive credit for each course they take. Listed below are groups of courses with similar content. Students will receive credit for only one of the courses in each group.

106, 111, 121, 190, 191
112, 122, 192
213, 222, 224, 293
221, 223, 231, 294
311 and 411
332 and 432
336 and 436
411 and 413
431 and 433
432 and 434

Fees

In some courses there may be a small fee for computer lab use or for photocopying materials to be handed out to students.

Summer Courses

A list of mathematics courses usually offered every summer can be found in the School of Continuing Education and Summer Sessions section of this catalog. Students interested in taking summer courses in mathematics should consult the Mathematics Department (255–4013). A tentative summer listing may be available as early as October.

Undergraduate Course Offerings

Please visit www.math.cornell.edu for further information and up-to-the-minute corrections.

Foundation courses: 105, 106, 109, 111, 112, 121, 122, 190, 191, 192, 213, 221, 222, 223, 224, 231, 293, 294

Mathematics Education: 408, 451

History of Mathematics: 403

General and Liberal Arts Courses: 103, 171, 401, 402, 408

Analysis: 311, 411, 413, 414, 418

Algebra and Number Theory: 332, 336, 431, 432, 433, 434, 436

Combinatorics: 441, 442

Geometry and Topology: 356, 451, 452, 453, 454, 455

Probability and Statistics: 171, 471, 472

Mathematical Logic: 281, 384, 481, 482, 483, 486

Applied Analysis and Differential Equations: 321, 420, 422, 423, 424, 425, 427, 428

MATH 103 Mathematical Explorations (II)
Fall, spring. 3 credits. This course may be used to satisfy the distribution requirement in mathematics.
This course is for students who wish to experience how mathematical ideas naturally evolve. The homework consists of the students actively investigating mathematical ideas. The course emphasizes ideas and imagination as opposed to techniques and calculations. Topics vary depending on the instructor and are announced (www.math.cornell.edu) several weeks before the semester begins. Some assessment is done through writing assignments.

MATH 105 Finite Mathematics for the Life and Social Sciences (II)
Fall. 3 credits. Prerequisite: 3 years of high school mathematics, including trigonometry and logarithms.
Course topics include: mathematical modeling, sets, functions, and graphing; transformations to linearize data (including use of log and semi-log paper); probability (with some applications to genetics); and matrices, systems of linear equations, and Markov chains. Examples from biology and the social sciences are used.

MATH 106 Calculus for the Life and Social Sciences (II)
Spring. 3 credits. Prerequisite: readiness for calculus, such as can be obtained from 3 years of high school mathematics (including trigonometry and logarithms) or any of the following Cornell courses: MATH 105, MATH 109, or EDUC 115. MATH 111, rather than 106, is recommended for those planning to take 112.*
Course serves as an introduction to differential and integral calculus, partial derivatives, elementary differential equations. Examples from biology and the social sciences are used.

MATH 109 Precalculus Mathematics
Summer. 3 transcript credits only; cannot be used toward graduation.
This course is designed to prepare students for MATH 111. Algebra, trigonometry, logarithms, and exponentials are reviewed.

MATH 111–112 Calculus
Calculus is the study of functions and processes from the point of view of how they are changing. What can we know of a function from the rate at which it changes? What is the cumulative effect of infinitely many infinitesimal changes? MATH 111 and 112 aim to provide, to students with little or no prior exposure to calculus, the knowledge that calculus is *useful,* in that its applications to the physical, biological, and social sciences have shaped our world, and *beautiful,* in that it represents a breathtaking attempt of the human mind to capture the infinitely large and the infinitely small. These courses seek to provide basic understanding, technical skills, and sample applications in various fields for the very broad range of students who take them. Topics are studied (as appropriate) by analytic, numerical, and graphical methods. These courses sometimes offer one or more sections with small-group projects. (See the Supplement to the Course and Room Roster.)

*See the list of courses with overlapping content at the end of the introduction.

MATH 111 Calculus (II)
Fall, spring. 4 credits. Prerequisite: MATH 109 or 3 years of high school mathematics, including trigonometry and logarithms.*
Course topics include: functions and graphs, limits and continuity, differentiation and integration of algebraic, trigonometric, inverse trig, logarithmic, and exponential functions; applications of differentiation, including graphing, max-min problems, tangent line approximation, implicit differentiation, and applications to the sciences; the mean value theorem; and antiderivatives, definite and indefinite integrals, the fundamental theorem of calculus, substitution in integration, the area under a curve. Graphing calculators are used, and their pitfalls are discussed, as applicable to the above topics.

MATH 111 can serve as a one-semester introduction to calculus or as part of a two-semester sequence in which it is followed by MATH 112 or 122.

MATH 112 Calculus (II)
Fall, spring. 4 credits. Prerequisite: MATH 111 with a grade of C or better or excellent performance in MATH 106. Those who do well in MATH 111 and expect to major in mathematics or a strongly mathematics-related field should take 122 instead of 112.*
Course focus is on integration: applications, including volumes and arc length; techniques of integration, approximate integration with error estimates, improper integrals, differential equations (separation of variables, initial conditions, systems, some applications). Also covered are infinite sequences and series: definition and tests for convergence, power series, Taylor series with remainder, and parametric equations.

MATH 121 Honors Calculus (II)
Fall. 4 credits. Prerequisite: 3 years of high school mathematics with average grade of A- or better, or permission of the department.*
This is a first-semester course in calculus intended for students who have been quite successful in their previous mathematics courses. The syllabus for the course is quite similar to that of MATH 111; however, the approach is more theoretical and the material is covered in greater depth.

MATH 122 Honors Calculus (II)
Fall, spring. 4 credits. Prerequisite: 1 semester of calculus with a high performance or permission of the department. Students planning to continue with MATH 213 are advised to take 112 instead of this course.*
Topics covered include: differentiation and integration of elementary transcendental functions, techniques of integration, applications, polar coordinates, infinite series, and complex numbers, as well as an introduction to proving theorems. The approach is more theoretical than in MATH 112.

MATH 171 Statistical Theory and Application in the Real World (II)
Fall, spring. 4 credits. Prerequisite: high school mathematics.
This introductory statistics course discusses techniques for analyzing data occurring in the real world and the mathematical and philosophical justification for these tech-

*See the list of courses with overlapping content at the end of the introduction.

niques. Topics include: population and sample distributions, central limit theorem, statistical theories of point estimation, confidence intervals, testing hypotheses, the linear model, and the least squares estimator. The course concludes with a discussion of tests and estimates for regression and analysis of variance (if time permits). The computer is used to demonstrate some aspects of the theory, such as sampling distributions and the Central Limit Theorem. In the lab portion of the course, students learn and use computer-based methods for implementing the statistical methodology presented in the lectures. (No previous familiarity with computers is presumed.)

MATH 190 Calculus for Engineers (II)
Fall. 4 credits. Prerequisite: 3 years of high school mathematics, including trigonometry and logarithms.*
Course topics include: plane analytic geometry, differential and integral calculus, and applications. This course is restricted to engineering students who have had no previous successful experience with calculus. Students who have had such experience but wish a first-semester calculus course should take MATH 191.

MATH 191 Calculus for Engineers (II)
Fall, spring. 4 credits. Prerequisite: 3 years of high school mathematics including trigonometry and logarithms, plus some knowledge of calculus.*
Course topics include: plane analytic geometry, differential and integral calculus, and applications. MATH 191 covers essentially the same topics as 190, but is designed for students with some previous successful experience with calculus.

MATH 192 Calculus for Engineers (II)
Fall, spring. 4 credits. Prerequisite: MATH 190 or 191.*
Course topics include: polar coordinates, infinite series, and power series. Also covered are: vectors and calculus of functions of several variables through double and triple integrals.

MATH 213 Calculus (II)
Fall, spring. 4 credits. Prerequisite: MATH 112, 122, or 192.*
Course topics include: vectors and vector-valued functions; multivariable and vector calculus including multiple and line integrals; first- and second-order differential equations with applications; systems of differential equations; and elementary partial differential equations. This course is designed for students who wish to master the basic techniques of calculus, but whose major will not require a substantial amount of mathematics. The course may emphasize different topics in the syllabus in different semesters.

MATH 221 Linear Algebra and Calculus (II)
Fall, spring. 4 credits. Prerequisite: 2 semesters of calculus with high performance or permission of the department.*
Course covers linear algebra and differential equations. Topics include: vector algebra, linear transformations, matrices, and linear differential equations, as well as an introduction to proving theorems. This course is especially recommended for students who plan to major in mathematics or in a strongly related field.

*See the list of courses with overlapping content at the end of the introduction.

MATH 222 Calculus (II)
Fall, spring. 4 credits. Prerequisite: MATH 221.*
Course topics include: multivariable and vector differential and integral calculus, including multiple, line, and surface integrals. This course is especially recommended for students who plan to major in mathematics or in a strongly related field.

MATH 223 Honors Linear Algebra and Calculus (II)
Fall. 4 credits. Prerequisite: 2 semesters of calculus with a grade of A– or better, or permission of instructor.*
Course topics include: vectors, matrices, and linear transformations; differential calculus of functions of several variables; inverse and implicit function theorems; quadratic forms, extrema, and manifolds; multiple and iterated integrals. MATH 223–224 provides an integrated treatment of linear algebra and multivariable calculus designed for students who have been highly successful in their previous calculus courses.

MATH 224 Honors Linear Algebra and Calculus (II)
Spring. 4 credits. Prerequisite: MATH 223.*
Course topics include: vector fields; line integrals; differential forms and exterior derivative; work, flux, and density forms; integration of forms over parametrized domains; and Green's, Stoke's, and divergence theorems.

MATH 231 Linear Algebra (II)
Spring. 3 credits. Prerequisite: MATH 111 or equivalent.*
Course topics include: vectors, matrices, and linear transformations, affine and Euclidean spaces, transformation of matrices, and eigenvalues.

MATH 281 Deductive Logic (also PHIL 331) (II)
Fall. 4 credits.
For description, see PHIL 331.

MATH 293 Engineering Mathematics (II)
Fall, spring. 4 credits. Prerequisite: MATH 192.*
Course topics include: vector fields and vector calculus; complex numbers; introduction to ordinary and partial differential equations; and Fourier series and boundary value problems. May include computer use in problem solving.

MATH 294 Engineering Mathematics (II)
Fall, spring. 4 credits. Prerequisite: MATH 192.*
Course topics include: matrix theory and linear algebra, inner product spaces; and systems of linear ordinary differential equations. May include computer use in solving problems.

MATH 311 Introduction to Analysis (II)
Spring. 4 credits. Prerequisites: MATH 221–222 or 293–294.
Provides a transition from calculus to real analysis. Topics include: rigorous treatment of fundamental concepts in calculus: including limits and convergence of sequences and series, compact sets; continuity, uniform continuity and differentiability of functions. Emphasis will be placed upon understanding and constructing mathematical proofs.

*See the list of courses with overlapping content at the end of the introduction.

MATH 321 Manifolds and Differential Forms (II)
Fall. 4 credits. Prerequisites: multivariable calculus and linear algebra as taught in MATH 221–222 or 293–294.
Topics for this course include: differential forms, exterior derivative, implicit function theorem, manifolds, orientation, boundaries, integration of forms, generalized Stokes' theorem, Hodge star operator, Laplace operator, basics of de Rham cohomology. We reexamine the integral theorems of vector calculus (Green, Gauss, and Stokes) in the light of the exterior differential calculus and apply differential forms to problems in partial differential equations, fluid mechanics and electromagnetism.

MATH 332 Algebra and Number Theory (II)
Fall. 4 credits. Prerequisite: MATH 221, 223, 231 or 294.*
Course covers various topics from number theory and modern algebra, usually including most of the following: Primes and factorization, Diophantine equations, congruences, quadratic reciprocity, continued fractions, rings and fields, finite groups, and an introduction to the arithmetic of the Gaussian integers and quadratic fields. Motivation and examples for the concepts of abstract algebra are derived primarily from number theory and geometry.

MATH 336 Applicable Algebra (II)
Spring. 4 credits. Prerequisite: MATH 221, 223, 231 or 294.*
An introduction to the concepts and methods of abstract algebra and number theory that are of interest in applications. Covers: basic theory of groups, rings and fields and their applications to such areas as public-key cryptography, error-correcting codes, parallel computing, and experimental designs. Also covers: elementary number theory, Euclidean algorithm, prime factorization, congruences, theorems of Fermat and Euler, elementary group theory, Chinese remainder theorem, factorization in the ring of polynomials, and classification of finite fields. Applications include the RSA cryptosystem and use of finite fields to construct error-correcting codes and Latin squares.

MATH 356 Groups and Geometry (II)
Spring. 4 credits. Prerequisite: MATH 221, 223, 231 or 294.
Groups were introduced in the nineteenth century as the set of symmetries of an algebraic or geometric object, and this viewpoint is a central one in modern Mathematics. This course studies the geometry of the planes and of patterns in the plane in terms of the group of symmetries ("isometries") of the plane. Prior knowledge of groups is not a prerequisite. One aim is to give students experience in modern algebra and geometry (including the geometry of complex numbers) and a sense of the unity of mathematics before they take the 400-level courses Special care is given to initiate the student into the writing of proofs and the language of mathematics. Topics include: symmetries; groups of transformations; subgroups and cosets; homomorphisms and isomorphisms; orbits and fixed points; Frieze groups, wallpaper groups ("2-dimensional crystallographic groups"); and the associated tesselations of the Euclidean plane.

*See the list of courses with overlapping content at the end of the introduction.

MATH 384 Foundations of Mathematics (also PHIL 434) (II)
Fall. 4 credits. Prerequisite: 1 course in logic or permission of instructor.
For description, see PHIL 434.

MATH 401 Honors Seminar: Topics in Modern Mathematics (II)
Spring. 4 credits. Prerequisite: 2 courses in mathematics numbered 300 or higher or permission of instructor.
This course is a participatory seminar primarily aimed at introducing senior and junior mathematics majors to some of the challenging problems and areas of modern mathematics. The seminar helps students develop research and expository skills in mathematics, which is important for careers in any field that makes significant use of the mathematical sciences (i.e., pure or applied mathematics, physical or biological sciences, business and industry, medicine). The content varies from year to year.

MATH 402 Smorgasbord Seminar
Fall. 1 credit. Prerequisite: 2 courses in mathematics numbered 300 or higher. S-U only. Recommended for mathematics majors. A student may only receive credit for this course once.
A lecture series by members of the Mathematics Department about current research topics, to give students a little taste of many different areas in mathematics. This course is valuable for students looking for a topic for a senior thesis and for students thinking about graduate work in the mathematical sciences.

MATH 403 History of Mathematics # (II)
Spring. 4 credits. Prerequisite: 2 courses in mathematics above 300, or permission of instructor.
Survey of the development of mathematics from antiquity to the present, with an emphasis on the achievements, problems, and mathematical viewpoints of each historical period and the evolution of such basic concepts as number, geometry, construction, and proof. Readings from original sources in translation. Students are required to give oral and written reports.

[MATH 408 Mathematics in Perspective (II)
Spring. 4 credits. Prerequisite: consent of instructor. Not offered 2001–2002.
The purpose of this course is for students to step back and form an overview of the mathematics they have learned. The course is intended for junior and senior mathematics majors and other undergraduates with strong backgrounds in mathematics.]

[MATH 411 Introduction to Analysis (II)
4 credits. Prerequisite: MATH 221–222, 223–224 or 293–294. Students who need measure theory and Lebesgue integration for advanced probability courses should take MATH 413–414 or audit the first few weeks of MATH 621. Undergraduates who plan to attend graduate school in mathematics should take 413–414.* Will not be offered again.
An introduction to the theory of functions of real variables, stressing concepts and a logical development of the subject rather than applications. Topics include: Euclidean spaces, the real number system, continuous and differentiable functions, uniform convergence and approximation theorems, and the Riemann integral. Students who wish to continue study of theoretical analysis upon completion of MATH 411 may take, for example, MATH 418.]

MATH 413–414 Honors Introduction to Analysis (II)
413, fall; 414, spring. 4 credits each. Prerequisite for 413: a high level of performance in MATH 221–222, 223–224 or 293–294. Prerequisite for MATH 414: MATH 413.*
This sequence, designed for honors students, provides an introduction to the theory of functions of real variables, stressing a rigorous logical development of the subject rather than applications. Topics include: metric spaces, the real number system, continuous and differentiable functions, uniform convergence and approximation theorems, Fourier series, Riemann and Lebesgue integrals, calculus in several variables, and differential forms.

MATH 418 Introduction to the Theory of Functions of One Complex Variable (II)
Spring. 4 credits. Prerequisite: MATH 223–224, 311, 411 or 413 or permission of instructor.
A theoretical and rigorous introduction to complex variable theory. Topics include: complex numbers, differential and integral calculus for functions of a complex variable including Cauchy's theorem and the calculus of residues, elements of conformal mapping. Students interested in the applications of complex analysis should consider MATH 422.

MATH 420 Differential Equations and Dynamical Systems (II)
Fall, spring. 4 credits. Prerequisite: high level of performance in MATH 293–294, 221–222, 223–224, or permission of instructor.
Course covers ordinary differential equations in one and higher dimensions: qualitative, analytic, and numerical methods. Emphasis is on differential equations as models and the implications of the theory for the behavior of the system being modeled and includes an introduction to bifurcations.

MATH 422 Applied Complex Analysis (II)
Spring. 4 credits. Prerequisite: MATH 221–222, 223–224, 293–294, or 213 and 231.
Course covers complex variables, Fourier transforms, Laplace transforms and applications to partial differential equations. Additional topics may include an introduction to generalized functions.

[MATH 423 Applicable Analysis III (II)
4 credits. Will not be offered again.]

MATH 424 Wavelets and Fourier Series (II)
Spring. 4 credits. Prerequisite: MATH 221–222, 223–224, 293–294, or permission of instructor.
Both Fourier series and wavelets provide methods to represent or approximate general functions in terms of simple building blocks. Such representations have important consequences, both for pure mathematics and for applications. Fourier series use *natural* sinusoidal building blocks and may be used to help solve differential equations. Wavelets use *artificial* building blocks that have the advantage of localization in space. A full understanding of both topics requires a background involving Lebesgue integration theory and functional analysis. This course presents as much as possible on both topics without such formidable prerequisites. The emphasis is on clear statements of results and key ideas of proofs, working out examples, and applications. Related topics that may be included in the course: Fourier transforms, Heisenberg uncertainty principle, Shannon sampling theorem, and Poisson summation formula.

[MATH 425 Numerical Solutions of Differential Equations (II)
Spring. 4 credits. Prerequisite: MATH 221–222, 223–224, or 293–294 and one course numbered 300 or higher in mathematics, or permission of instructor. Generally offered every two years. Not offered 2001–2002.
Course covers methods and basic theory for the numerical solution of ordinary and partial differential equations. Topics include: linear multistep methods, Runge-Kutta methods, and the problem of stiffness for ordinary differential equations. Also covers: finite difference methods and Galerkin finite element methods for partial differential equations. Homework involves use of a computer.]

MATH 427 Introduction to Ordinary Differential Equations (II)
Spring. 4 credits. Prerequisite: MATH 221–222, 223–224, or 293–294 or permission of instructor.
Covers the basic existence, uniqueness, and stability theory together with methods of solution and methods of approximation. Topics include: singular points, series solutions, Sturm-Liouville theory, transform methods, approximation methods, and application to physical problems.

MATH 428 Introduction to Partial Differential Equations (II)
Fall. 4 credits. Prerequisite: MATH 221–222, 223–224, or 293–294 or permission of instructor.
Topics selected from first-order quasilinear equations, classification of second-order equations, with emphasis on maximum principles, existence, uniqueness, stability, Fourier series methods, approximation methods.

MATH 431–432 Introduction to Algebra (II)
431, fall; 432, spring. 4 credits each. Prerequisite: MATH 221, 223, 231, or 294. Prerequisite for MATH 432: MATH 431 or 433, or permission of instructor. Undergraduates who plan to attend graduate school in mathematics should take 433–434.*
431: An introduction to linear algebra, including: the study of vector spaces, linear transformations, matrices, and systems of linear equations; quadratic forms and inner product spaces; canonical forms for various classes of matrices and linear transformations; and determinants. 432: An introduction to various topics in abstract algebra, including: groups, rings, fields, factorization of polynomials and integers, congruences, and the structure of finitely generated modules over Euclidean domains with application to canonical forms of matrices.

*See the list of courses with overlapping content at the end of the introduction.

MATH 433–434 Honors Introduction to Algebra (II)
433, fall; 434, spring. 4 credits each. Prerequisite: a high level of performance in MATH 221, 223, 231, or 294. Prerequisite for MATH 434: MATH 433 or permission of instructor.*
Honors version of MATH 431–432. MATH 433–434 is more theoretical and rigorous than 431–432 and includes additional material such as multilinear and exterior algebra.

[MATH 436 Applications of Abstract Algebra (II)
Spring. 4 credits. Prerequisites: Linear algebra (MATH 221, 223, 231, or 294 or higher). Familiarity with elementary algebra or number theory such as MATH 332 would also be helpful.* Not offered 2001–2002.
The course is intended for students who would like to learn modern algebra and its applications outside of mathematics. There is at least as much emphasis on applications as the relevant modern algebra. Frequently the applications involve or were made possible by the advent of computers. Students who already know the modern algebra covered in the course may still find the applications of interest. Specific topics are chosen by the instructor. The algebra typically includes items drawn from: elementary number theory, polynomials and ring theory, monoids and group theory, real closed fields, algebraic combinatorics, Groebner bases, algebraic geometry, and field theory. The applications and related topics typically include items drawn from: complexity theory, coding theory, encryption, discrete and fast Fourier transform, primality testing, factoring integers and polynomials, root counting and isolation, solving systems of polynomial equations, formal language theory, and automata.

MATH 336 and 436 may overlap in choice of material. Where they overlap, the coverage in MATH 436 is of greater depth appropriate to a 400-level course. Students cannot get credit for both MATH 336 and MATH 436.]

MATH 441 Introduction to Combinatorics (II)
Fall. 4 credits. Prerequisite: MATH 221, 223, 231, or 294. Generally offered every two years.
Course covers enumerative combinatorics: permutation enumeration, Stirling and Bell numbers, generating functions, exponential formula, Lagrange inversion, recurrences, basic asymptotic methods, rational generating functions. Also covers basic graph theory: trees and Cayley's theorem, chromatic polynomial, eigenvalues and their application. Also considers matching theory: equivalences, marriage theorem, flow problems, totally unimodular matrices. Also considers Polya theory: action of a group on a set, Burnside lemma, DeBruijn's method, applications to graphical enumeration and algorithms.

[MATH 442 Introduction to Combinatorics (II)
Spring. 4 credits. Prerequisite: MATH 221, 223, 231, or 294. Generally offered every two years. Not offered 2001–2002.
Course topics include: Sieves and Mobius Inversion: inclusion/exclusion and its application to enumeration and number theory; partially ordered sets, abstract Mobius inversion, rudiments of lattice theory; matroids and combinatorial geometry: rank function, circuits, bases, application to graph theory and geometry; combinatorial design: Fisher's inequality, Latin squares, Hadamard matrices, Wilson's theorem on t-designs, application to statistical design; nonconstructive methods: Ramsey's theorem, Lovasz's local lemma, random graphs, application to coding theory; and extremal set theory: Sperner's lemma, Kruskal-Katona and Erdös-Ko-Rado theorems.]

MATH 451 Euclidean and Spherical Geometry (II)
Fall. 4 credits. Prerequisite: MATH 221, 223, 231, or 294, or permission of instructor.
Covers topics from Euclidean and spherical (non-Euclidean) geometry. A nonlecture, seminar-style course organized around student participation.

MATH 452 Classical Geometries (II)
Spring. 4 credits. Prerequisite: MATH 221, 223, 231, or 294, or permission of instructor.
This is an introduction to hyperbolic, spherical, and projective geometry—the classical geometries that developed as Euclidean geometry was better understood. For example, the historical problem of the independence of Euclid's fifth postulate is understood when the existence of the hyperbolic plane is realized. Straightedge (and compass) constructions and stereographic projection in Euclidean geometry can be understood within the structure of projective geometry. Topics in hyperbolic geometry include: models of the hyperbolic plane and relations to spherical geometry. Topics in projective geometry include: homogeneous coordinates and the classical theorems about conics and configurations of points and lines. Optional topics include: principles of perspective drawing, finite projective planes, orthogonal Latin squares, and the cross ratio.

MATH 453 Introduction to Topology (II)
Fall. 4 credits. Prerequisite: MATH 411 or 413, or permission of instructor.
Course covers basic point set topology, connectedness, compactness, metric spaces, fundamental group. Application of these concepts to surfaces such as the torus, the Klein bottle, and the Moebius band.

MATH 454 Introduction to Differential Geometry (II)
Spring. 4 credits. Prerequisites: MATH 221–222, 223–224, or 293–294, plus at least one mathematics course numbered 300 or above. MATH 453 is not a prerequisite.
Course covers differential geometry of curves and surfaces. Also covers curvature, geodesics, and differential forms. Serves as an introduction to n-dimensional Riemannian manifolds. This material provides some background for the study of general relativity; connections with the latter are indicated.

MATH 455 Applicable Geometry (II)
Fall. 4 credits. Prerequisite: a good introduction to linear algebra (such as in MATH 221, 223, 231, or 294) or permission of the instructor. It is not assumed that students know what any of the words in the following description mean. Generally offered every two years.
An introduction to the theory of n-dimensional convex polytopes and polyhedra and some of its applications, with an in-depth treatment of the case of 3-dimensions. We discuss both combinatorial properties (such as face counts) as well as metric properties (such as rigidity). Covers theorems of Euler, Cauchy, and Steinitz, Voronoi diagrams and triangulations, convex hulls, cyclic polytopes, shellability and the upper-bound theorem. We relate these ideas to applications in tiling, linear inequalities and linear programming, structural rigidity, computational geometry, hyperplane arrangements and zonotopes.

MATH 471 Basic Probability (II)
Fall. 4 credits. Prerequisite: MATH 221, 223, 231, or 294. May be used as a terminal course in basic probability.
Topics include: combinations, important probability laws, expectations, moments, moment-generating functions, limit theorems. Emphasis is on diverse applications and on development of use in statistical applications. See also the description of MATH 671.

MATH 472 Statistics (II)
Spring. 4 credits. Prerequisites: MATH 471 and knowledge of linear algebra such as taught in MATH 221. Some knowledge of multivariable calculus helpful but not necessary.
Classical and recently developed statistical procedures are discussed in a framework that emphasizes the basic principles of statistical inference and the rationale underlying the choice of these procedures in various settings. These settings include problems of estimation, hypothesis testing, and large sample theory.

[MATH 481 Mathematical Logic (also PHIL 431) (II)
Spring. 4 credits. Generally offered every two years. Not offered 2001–2002.
Course covers: propositional and predicate logic; classical proof procedures; completeness and compactness; decidability and undecidability; the Godel incompleteness theorem; and elements of set theory.]

[MATH 482 Topics in Logic (also PHIL 432) (II)
Spring. 4 credits. Prerequisite: 1 logic course from the Mathematics Department at the 200 level or higher, 1 logic course from the Philosophy Department at the 300 level or higher, or permission of the instructor. Not offered 2001–2002.
For description, see PHIL 432.]

MATH 483 Intensional Logic (also PHIL 436) (II)
Spring. 4 credits. Prerequisite: 1 logic course at the 200 level or higher from the Philosophy Department or the Mathematics Department, or permission of instructor.
For description, see PHIL 436.

MATH 486 Applied Logic (also COM S 486) (II)
Spring. 4 credits. Prerequisites: MATH 221–222, 223–224, or 293–294; COM S 280 or equivalent (such as MATH 332, 336, 432, 434, 436, or 481); and some additional course in mathematics or theoretical computer science.
Course covers: propositional and predicate logic; compactness and completeness by tableaux, natural deduction, and resolution. Other possible topics include: equational logic; Herbrand Universes and unification; rewrite rules and equational logic, Knuth-Bendix method and the congruence-closure algorithm and lambda-calculus reduction strategies; topics in Prolog, LISP, ML, or Nuprl; and applications to expert systems and program verification.

*See the list of courses with overlapping content at the end of the introduction.

MATH 490 Supervised Reading and Research
Fall, spring. 1–6 credits.
Supervised reading and research by arrangement with individual professors. Not for material currently available in regularly scheduled courses.

Professional Level and Mathematics Education Courses

MATH 500 College Teaching
Fall, weeks 1–6. 1 credit.
Among the topics covered: basic topics about teaching, such as how to plan recitations, how to prepare lesson plans for lectures, exam design and grading, syllabus planning. Also discussed: the structure of colleges and universities, jobs and tenure, professionalism, alternative teaching strategies.

[MATH 503 History of Modern Mathematics
Spring. 4 credits. Prerequisites: undergraduate algebra and analysis. Generally offered every two years. Not offered 2001–2002.
Topics in the history of modern mathematics at the level of F. Klein's *Evolution of Mathematics in the 19th Century*, J. Dieudonne's *Abrege D'Histoire Des Mathematiques 1700–1900*, and G. Birkhoff's *Source Book of Classical Analysis*.]

MATH 505 Educational Issues in Undergraduate Mathematics
Spring. 4 credits. Prerequisite: graduate standing or permission of the instructor. Generally offered every two years.
This course examines various educational issues in undergraduate mathematics and the relationship of these issues to the mathematics itself. The precise choice of topics varies, but the intent is that a balance of different views be presented and discussed. There are extensive readings in the course and occasional guest lectures. Possible topics include: nature of proof and how and when to teach it, calculus "reform," teaching mathematics to school teachers, using writing, using history, alternative assessments, alternatives to lecturing, equity issues, effective uses of technology, what is mathematical understanding and how do we recognize it, what should every mathematics major know, and research in undergraduate mathematics.

MATH 507 Teaching Secondary Mathematics: Theory and Practices
Spring. 4 credits.
This course provides direct experience of new approaches, curricula and standards in mathematics education. Discussion of articles, activities for the secondary classroom and videotape of classroom teaching is tied to in-class exploration of math problems. Experience in the computer lab, examining software environments and their use in the mathematics classroom is included. Participants are expected to write short papers, share ideas in class and present their opinions on issues.

MATH 508 Mathematics for Secondary School Teachers
Fall, spring. 1–6 credits. Prerequisite: secondary school mathematics teacher, or permission of instructor. May not be taught every semester.
An examination of the principles underlying the content of the secondary school mathematics curriculum, including connections with the history of mathematics and current mathematics research.

Graduate Courses

Many of our graduate courses are topics courses for which descriptions are not included here; however, during each pre-enrollment period a schedule of graduate courses to be offered the following semester is posted at www.math.cornell.edu/Courses. This schedule includes course descriptions that are often more detailed than those included here, as well as a means for interested students to participate in the process of selecting meeting times.

MATH 611–612 Real and Complex Analysis
611, fall; 612, spring. 4 credits each.
611 covers: measure and integration and functional analysis. 612 covers: complex analysis, Fourier analysis, and distribution theory.

MATH 613–[614] Topics in Analysis
613, fall; 614, spring. 4 credits each. 614 Not offered 2001–2002.

MATH 615–[616] Mathematical Methods in Physics
615, fall; 616, spring. 4 credits each. Intended for graduate students in physics or related fields who have had a strong advanced calculus course and at least 2 years of general physics. A knowledge of the elements of finite dimensional vector space theory, complex variables, separation of variables in partial differential equations, and Fourier series is assumed. Undergraduates are admitted only with permission of instructor. MATH 615 is a prerequisite for 616. MATH 616 not offered 2001–2002.
Topics are designed to give a working knowledge of the principal mathematical methods used in advanced physics. 615 covers: Hilbert space, generalized functions, Fourier transform, Sturm-Liouville problem in ODE, Green's functions, and asymptotic expansions. 616 covers: Linear operators. Also covers: differential operators and integral operators, the equations and eigenvalue problems connected with them and the special functions arising from them; elements of group theory; and the rotation group and its representations.

MATH 617 Dynamical Systems
Fall. 4 credits. Generally offered every two years.
Topics include: existence and uniqueness theorems for ODEs; Poincaré-Bendixon theorem and global properties of two dimensional flows; limit sets, nonwandering sets, chain recurrence, pseudo-orbits and structural stability; linearization at equilibrium points: stable manifold theorem and the Hartman-Grobman theorem; and generic properties: transversality theorem and the Kupka-Smale theorem. Examples include: expanding maps and Anosov diffeomorphisms; hyperbolicity: the horseshoe and the Birkhoff-Smale theorem on transversal homoclinic orbits; rotation numbers; Herman's theorem; and characterization of structurally stable systems.

[MATH 618 Smooth Ergodic Theory
Spring. 4 credits. Generally offered every two years. Not offered 2001–2002.
Topics include: invariant measures; entropy; Hausdorff dimension and related concepts; hyperbolic invariant sets: stable manifolds, Markov partitions and symbolic dynamics; equilibrium measures of hyperbolic attractors; ergodic theorems; Pesin theory: stable manifolds of nonhyperbolic systems; Liapunov exponents; and relations between entropy, exponents, and dimensions.]

MATH 619–620 Partial Differential Equations
619, fall; 620, spring. 4 credits each. Generally offered every two years.
Course covers basic theory of partial differential equations.

MATH 621 Measure Theory and Lebesgue Integration
Fall. 4 credits.
Course covers measure theory, integration, and Lp spaces.

[MATH 622 Applied Functional Analysis
Spring. 4 credits. Not offered every year.
Course covers basic theory of Hilbert and Banach spaces and operations on them. Applications.]

[MATH 628 Complex Dynamical Systems
Fall. 4 credits. Prerequisite: MATH 418. Not offered every year. Next offered 2002–2003.
Various topics in the dynamics of analytic mappings in one complex variable, such as: Julia and Fatou sets, the Mandelbrot set, Mañe-Sad-Sullivan's theorem on structural stability. Also covers: local theory, including repulsive cycles and the Yoccoz inequality, parabolic points and Ecalle-Voronin invarients, Siegel disks and Yoccoz's proof of the Siegel Brjuno theorem; quasi-conformal mappings and surgery: Sullivan's theorem on non-wandering domains, polynomial-like mappings and renormalization, Shishikura's constructin of Hermann rings; puzzles, tableaux and local connectivity problems; and Thurston's topological characterization of rational functions, the spider algorithm, and mating of polynomials.]

MATH 631–[632]–634 Algebra
631, fall; 632, spring; 634, spring. 4 credits each. 632 and 634 offered in alternate years. 632 not offered 2001–2002.
631 covers: finite groups, field extensions, Galois theory, rings and algebras, and tensor and exterior algebra. 632 covers: Wedderburn structure theorem, Brauer group, and group cohomology. 634 covers: Dedekind domains, primary decomposition, Hilbert basis theorem, and local rings.

[MATH 649 Lie Algebras
Fall. 4 credits. Generally offered every two years. Not offered 2001–2002.
Topics include: nilpotent, solvable and reductive Lie algebras; enveloping algebras; root systems; Coxeter groups; and classification of simple algebras.]

MATH 650 Lie Groups
Spring. 4 credits. Generally offered every two years.
Course topics include: topological groups, Lie groups; relation between Lie groups and Lie algebras; exponential map, homogeneous manifolds; and invariant differential operators.

MATH 651 Introductory Algebraic Topology
Spring. 4 credits.
Course covers fundamental group and covering spaces, and homology theories for complexes and spaces.

MATH 652 Differentiable Manifolds I
Fall. 4 credits. Prerequisites: advanced calculus, linear algebra (MATH 431), point-set topology (MATH 453).
This is an introduction to differential geometry and differential topology at the level of a beginning graduate student. Topics include: smooth manifolds, embeddings, tangent bundles, tensors, vector bundles, vector fields, and Frobenius' theorem. Further topics chosen by instructor from other major areas such as fibre bundles, Lie groups, connections, curvature, geodesics, Riemannian manifolds, differential forms, and de Rham cohomology.

[MATH 653 Differentiable Manifolds II
Spring. Prerequisites: MATH 652 or equivalent. Generally offered every 3–4 years. Not offered 2001–2002.
Advanced topics from differential geometry and differential topology selected by instructor. Examples of eligible topics include: transversality, cobordism, Morse theory, classification of vector bundles and principal bundles, characteristic classes, microlocal analysis, conformal geometry, geometric analysis and partial differential equations, and Atiyah-Singer index theorem.]

MATH 661 Geometric Topology
Fall. 4 credits.
An introduction to some of the more geometric aspects of topology and its connections with group theory. Possible topics include: surface theory, 3-manifolds, knot theory, geometric and combinatorial group theory, hyperbolic groups, and hyperbolic manifolds.

MATH 662 Riemannian Geometry
Spring. 4 credits. Generally offered every two years.
Course topics include: linear connections, Riemannian metrics and parallel translation; covariant differentiation and curvature tensors; the exponential map, the Gauss Lemma and completeness of the metric; isometries and space forms, Jacobi fields and the theorem of Cartan-Hadamard; the first and second variation formulas; the index form of Morse and the theorem of Bonnet-Myers; the Rauch, Hessian, and Laplacian comparison theorems; the Morse index theorem; the conjugate and cut loci; and submanifolds and the Second Fundamental form.

MATH 671–672 Probability Theory
671, fall; 672, spring. 4 credits each. Prerequisite: a knowledge of Lebesgue integration theory, at least on the real line. Students can learn this material by taking parts of MATH 413–414 or 621. Prerequisite for MATH 672: MATH 671.
Course topics include: properties and examples of probability spaces; sample space, random variables, and distribution functions; expectation and moments; independence, Borel-Cantelli lemma, zero-one law; convergence of random variables, probability measures, and characteristic functions; law of large numbers; selected limit theorems for sums of independent random variables; Markov chains, recurrent events; ergodic and renewal theorems; Martingale theory; and Brownian motion and processes with independent increments.

MATH 674 Introduction to Mathematical Statistics
Spring. 4 credits. Prerequisites: MATH 671 and OR&IE 670 or permission of instructor.
Topics include: an introduction to the theory of point estimation, hypothesis testing and confidence intervals, consistency, efficiency, sufficiency, and the method of maximum likelihood. Basic concepts of decision theory are discussed; asymptotic methods are introduced and developed in detail. The course is coordinated with OR&IE 670 to form the second part of a one-year course in mathematical statistics.

MATH 681 Logic
Spring. 4 credits.
Course covers basic topics in mathematical logic, including propositional and predicate calculus; formal number theory and recursive functions; completeness and incompleteness theorems. Other topics as time permits.

MATH 711–[712] Seminar in Analysis
711, fall; 712, spring. 4 credits each. 712 not offered 2001–2002.

[MATH 713 Functional Analysis
Spring. 4 credits. Not offered 2001–2002.
Course covers: topological vector spaces, Banach and Hilbert spaces, and Banach algebras. Additional topics selected by instructor.]

MATH 715 Fourier Analysis
Fall. 4 credits. Generally offered every two years.

MATH 717 Applied Dynamical Systems (also T&AM 776)
Spring. 4 credits. Suggested prerequisite: T&AM 675, MATH 617, or equivalent. Generally offered every two years.
Course topics include: review of planar (single-degree-of-freedom) systems; local and global analysis; structural stability and bifurcations in planar systems; center manifolds and normal forms; the averaging theorem and perturbation methods; Melnikov's method; discrete dynamical systems, maps and difference equations, homoclinic and heteroclinic motions, the Smale Horseshoe and other complex invariant sets; global bifurcations, strange attractors, and chaos in free and forced oscillator equations; and applications to problems in solid and fluid mechanics.

[MATH 722 Topics in Complex Analysis
Spring. 4 credits. Not offered every year.
Selections of advanced topics from complex analysis, such as Riemann surfaces, complex dynamics, and conformal and quasiconformal mapping. Course content varies.]

[MATH 728 Seminar in Partial Differential Equations
Fall. 4 credits. Generally offered every two years. Not offered 2001–2002.]

MATH 731–732 Seminar in Algebra
731, fall; 732, spring. 4 credits each.

MATH 735 Topics in Algebra
Fall. 4 credits.
Selection of advanced topics from algebra, algebraic number theory, and algebraic geometry. Course content varies.

MATH 737 Algebraic Number Theory
Fall. 4 credits.

MATH 739 Topics in Algebra
Spring. 4 credits.
Selection of advanced topics from algebra, algebraic number theory, and algebraic geometry. Course content varies.

MATH 740 Homological Algebra
Spring. 4 credits.

MATH 751–752 Seminar in Topology
751, fall; 752, spring. 4 credits each.

MATH 753 Algebraic Topology
Fall. 4 credits.
The continuation of 651. The standard topics covered in this course most years are cohomology, cup products, Poincaré duality, and homotopy groups. Other possible topics include fiber bundles, fibrations, vector bundles, and characteristic classes. The course may sometimes be taught from a differential forms viewpoint.

[MATH 754 Topics in Algebraic Topology
Spring. 4 credits. Prerequisite: MATH 753. Generally offered every 3–4 years. Not offered 2001–2002.
A selection of more advanced topics from algebraic topology, such as spectral sequences, K-theory, Bott periodicity, cobordism, or stable homotopy theory.]

MATH 757–758 Topics in Topology
757, fall; 758, spring. 4 credits each.
Selection of advanced topics from modern algebraic, differential, and geometric topology. Course content varies.

MATH 761–762 Seminar in Geometry
761, fall; 762, spring. 4 credits each. Either 761 or 762 generally offered every year.

MATH 767 Algebraic Geometry
Spring. 4 credits.

MATH 771–772 Seminar in Probability and Statistics
771, fall; 772, spring. 4 credits each.

[MATH 774 Asymptotic Statistics
Fall. 4 credits. Prerequisites: probability theory (MATH 671–672 or equivalent, containing stochastic processes) and statistics (MATH 472 or MATH 674). Not offered 2001–2002.
Introduction to asymptotic statistical decision theory and to empirical stochastic processes. Course covers: the notion of experiment, reduction by sufficiency, equivalence classes, the Le Cam delta distance, local asymptotic normality and minimaxity, optimal rates of convergence, white noise models, the Pinsker bound, and Gaussian approximation of nonparametric experiments. Includes topics in empirical processes include coupling theorems, some probability metrics, entropy conditions, functional limit theorems, and Hungarian constructions.]

MATH 777–778 Stochastic Processes
777, fall; 778, spring. 4 credits each.

MATH 781–782 Seminar in Logic
781, fall; 782, spring. 4 credits each.

MATH 783 Model Theory
Spring. 4 credits. Generally offered every two years.
An introduction to model theory at the level of the books by Hodges or Chang and Keisler.

MATH 784 Recursion Theory
Fall. 4 credits.
Course covers: theory of effectively computable functions; classification of recursively enumerable sets; degrees of recursive unsolvability; applications to logic; hierarchies; recursive functions of ordinals and higher type objects; generalized recursion theory.

[MATH 787 Set Theory
Spring. 4 credits. Generally offered every two years. Not offered 2001–2002.
A first course in axiomatic set theory at the level of the book by Kunen.]

MATH 788 Topics in Applied Logic
Fall. 4 credits.
This course covers applications of the results and methods of mathematical logic to other areas of mathematics and science. Topics vary each year; some recent examples are: automatic theorem proving, formal semantics of programming and specification languages, linear logic, constructivism (intuitionism), nonstandard analysis. Students are expected to be familiar with the standard results in graduate level mathematical logic.

MATH 790 Supervised Reading and Research
Fall, spring. 1–6 credits.

MATH 901–902 Oliver Club Seminar

MATH 903–904 Olivetti Club Seminar

MATH 905–906 Occasional Seminar on Undergraduate Education

MATH 907–908 Educational Issues in Undergraduate Mathematics

MATH 911–912 Seminar in Analysis

MATH 913–914 Seminar in Dynamics and Geometry

MATH 949–950 Seminar in Lie Groups

MATH 951–952 Topics in Topology and Geometry

MATH 967–968 Seminar in Combinatorial and Algebraic Geometry

MEDIEVAL STUDIES

See "Special Programs and Interdisciplinary Studies."

MUSIC

M. Scatterday, chair; S. Tucker, director of undergraduate studies (233 Lincoln Hall, 255–3423); D. Rosen, director of graduate studies (126 Lincoln Hall, 255–4974); M. Bilson, X. Bjerken, D. Borden, D. Conn, L. Coral, R. Harris-Warrick, M. Hatch, H. Hoffman, J. Hsu, J. Kellock, P. Merrill, J. Peraino, S. Pond, A. Richards, R. Riley, B. Robison, R. Sierra, S. Stucky, K. Tan, J. Webster, D. Yearsley, N. Zaslaw

Emeritus: K. Husa, S. Monosoff, R. Palmer, T. Sokol, M. Stith.

Department office: 255–4097.

Department web site: www.arts.cornell.edu/music/

Musical Performance and Concerts

Musical performance is an integral part of Cornell's cultural life and an essential part of its undergraduate academic programs in music. The department encourages music making through its offerings in individual instruction and through musical organizations and ensembles that are directed and trained by members of the faculty. Students from all colleges and departments of the university join with music majors in all of these ensembles:

Vocal ensembles
- Cornell Chamber Singers
- Cornell Chorale
- Cornell University Chorus
- Cornell University Glee Club
- Sage Chapel Choir

Instrumental ensembles
- Chamber Music Ensembles
- Cornell Chamber Orchestra
- Cornell Experimental Lab Ensemble
- Cornell Gamelan
- Cornell Jazz Ensembles
- Cornell Symphony Orchestra
- Cornell University Chamber Winds
- Cornell University Symphonic Band
- Cornell University Wind Ensemble
- Cornell University Wind Symphony

Information about requirements, rehearsal hours, and conditions for academic credit can be found in the following listings for the Department of Music. Announcements of auditions are posted during registration each fall term and, where appropriate, each spring term as well.

The university is also home to many student-run musical organizations, including the Big Red Marching Band and Big Red Pep Band, the Cornell Savoyards, and several a cappella groups. Information about these groups, too, is available through the Department of Music office, 101 Lincoln Hall (255–4097).

The Department of Music and the Faculty Committee on Music sponsor more than 100 formal and informal concerts each year by Cornell's ensembles, faculty, and students and by distinguished visiting artists. The great majority of concerts are free and open to the public. Lectures and concerts are listed on the web (www.arts.cornell.edu./music/). Additional information is available through the events office (255–4760).

Nonmajors

In addition to its performing, instructional, and concert activities, the department offers numerous courses for nonmajors, many of which carry no prerequisites and presuppose no previous formal training in music. Consult the following course listings, and for further information consult the department office, 101 Lincoln Hall (255–4097), or the director of undergraduate studies (255–3423).

The Major

The major carries the study of music to an advanced level through the integration of performance, music theory, and music history. It is designed to accommodate both students who are oriented toward eventual graduate or professional work in music and those who wish to take a more general approach, often in conjunction with a major in another department.

Students contemplating a major in music should arrange for placement examinations and advising in the department as early as possible, usually during the freshman orientation period. Information is available from the director of undergraduate studies. Prerequisites for admission to the major are completion of MUSIC 152 and 154, at the latest by the end of the sophomore year (the freshman year is preferable), with an overall grade of B- or better in each course. In consultation with the director of undergraduate studies, students are expected to have chosen an adviser from among the department faculty before acceptance into the major; admission to the major is decided by the faculty as a whole. Students majoring in music then design their course of study with their adviser.

Music majors must complete the Core Curriculum plus at least two electives. The Core Curriculum serves as the basis for focus in specific areas, such as composition, performance, jazz studies, vernacular music, Western art music, and Asian music. Students may, however, choose electives that reflect a more broadly-based study. Those intending to pursue graduate study or professional work in music are advised to take further courses in addition to the two required electives.

The Core Curriculum is comprised of:

1) in music theory: MUSIC 251, 252, 253, 254
2) in music history: MUSIC 207, 208, 300, 400
3) in performance: four semesters of participation in a musical organization or ensemble sponsored by the department of music (MUSIC 331 through 346 and 421 through 448)

Electives: at least two from the following:

1) in music theory: MUSIC 451–457
2) in music history: All courses above and including MUSIC 374
3) in performance: MUSIC 321, 322, 323, 324

Honors. The honors program in music is intended to provide special distinction for the department's ablest undergraduate majors. Qualified students are invited to become candidates by the faculty early in the second semester of their junior year. As soon as possible thereafter, the student forms a committee of three or more faculty members to guide and evaluate the honors work. In their senior year, candidates enroll in MUSIC 401–402 with the chair of the honors committee as instructor. Candidates are encouraged to formulate programs that allow them to demonstrate their musical and scholarly abilities, culminating in an honors thesis, composition, or recital, to be presented not later than April 1 of the senior year. A comprehensive examination administered by the candidate's committee is held not later than May 1. The level of honors conferred is based primarily on the candidate's performance in the honors program, and secondarily on the candidate's overall record in departmental courses and activities.

Distribution Requirement

College of Arts and Sciences students may apply either one or two Music Department courses toward the distribution requirement in Group 4 (humanities and the arts). Neither freshman seminars nor advanced placement credit count toward this requirement.

If one music course is counted for distribution, it must carry at least three credits, and it may not be in musical performance (MUSIC 321–322, 323–324) or in organizations and ensembles (MUSIC 331 through 346 and 421 through 448).

If two music courses are counted for distribution, they must total at least six credits, and at least one of the courses must be academic, not performance-oriented. The second "course," however, may comprise **either** up to four credits earned in perfor-

mance (MUSIC 321–322, 323–324) **or** up to four credits earned in organizations and ensembles (MUSIC 331 through 346 and 421 through 448), but not both.

Facilities

Music Library. The Sidney Cox Library of Music and Dance in Lincoln Hall has an excellent collection of standard research tools. Its holdings consist of approximately 127,000 books, periodicals, and scores and 50,000 sound and video recordings. Particularly noteworthy are the collections of opera from all periods; twentieth-century scores and recordings; a large microfilm collection of Renaissance sources, both theoretical and musical; and a collection of eighteenth-century chamber music. In addition, the Department of Rare Books, in the Kroch Library, houses a collection of early printed books on music and musical manuscripts.

Concert Halls. The Department of Music sponsors more than 100 concerts annually. Cornell's principal concert halls are Bailey Hall Auditorium (about 2,000), Alice Statler Auditorium (about 900), Sage Chapel (about 800) and Barnes Hall Auditorium (about 280).

Rehearsal Spaces. The orchestras and bands rehearse in Lincoln Hall, Bailey Hall, Barnes Hall, and Barton Hall; the Jazz Ensembles, Gamelan, and Chamber Ensembles rehearse in Lincoln Hall; and the choral ensembles are primarily quartered in Sage Chapel. Practice studios in Lincoln Hall are available for individual practice by pianists, vocalists, and instumentalists.

Thirty-five grand pianos and 22 upright or studio pianos are housed in Cornell's offices, classrooms, and rehearsal spaces. In addition, our Center for Keyboard Studies includes two concert grand pianos (Steinway and Mason & Hamlin), two eighteenth-century fortepiano replicas (copies of Johann Andreas Stein and Anton Walter), an original Broadwood grand piano from 1827, an 1824 Conrad Graf fortepiano replica, one Dowd and one Hubbard harpsichord, and a Challis clavichord.

Two chapels on campus house three distinctive organs that are available to qualified individuals for lessons and practice. These instruments include: a small Italian organ (1746); a two-manual mechanical action instrument (1972); and a three-manual symphonic organ (1941).

Digital/Electronic Equipment. A Macintosh Master studio is available for graduate student use (hours TBA) and occasional independent study use. The software used is Digital Performer, Finale, Peak, and eMagic editor/librarians. The instruments include a Yamaha KX88 MIDI Controller keyboard, a Yamaha TX802 FM synthesizer, an E-Mu Proteus XR, a Casio FZ 10M sampler and various other synthesizers. In addition, there are four MIDI work stations with additional instruments, including a Korg M1 synthesizer and an Akai S900 sampler.

Introductory Courses

Note: Class meeting times are accurate at the time of publication. If changes are necessary, the department will provide new information as soon as possible.

MUSIC 100 Elements of Musical Notation
Fall or spring, weeks 2–5. 1 credit. Prerequisite: concurrent enrollment in any 3-credit course in music and permission of instructor. D. Conn.
This four-week course, given at the beginning of each term, fulfills the requirement of basic pitch and rhythm and reading skills needed for some introductory courses and 200-level courses with prerequisites. The material covered in this course is no longer part of MUSIC 105.

MUSIC 101 Popular Music in America: A Historical Survey (also AM ST 105) # (IV)
Spring. 3 credits. 1-hour disc TBA. S. Pond.
A survey of the history and diverse streams of popular music in America. Elementary vocabulary and techniques for describing, analyzing, and evaluating music. Covers the relationships between mainstream musics, tributaries, and side-streams, and between folk, art, and popular music.

MUSIC 103 Intro to World Music I: Africa and the Americas (also LSP 100) @ (IV)
Spring. 3 credits. 1-hour disc TBA. No previous training in music required. S. Pond.
Exploration of folk, popular, and traditional musical genres of the Western Hemisphere, particularly the African diaspora. The course examines both the elements of musical styles and the features of society that influence music. Listening assignments are major components of the course.

MUSIC 104 Intro to World Music II: Asia @ (IV)
Fall. 3 credits. 1-hour disc to be arranged. No previous training in music required. M. Hatch.
Exploration of folk, popular, and traditional musical genres from South, Southeast, and East Asia. The course examines both the elements of musical styles and the features of society that influence music. Listening assignments are major components of the course.

MUSIC 105 Introduction to Music Theory (IV)
Fall, spring, or summer. 3 credits. Plus 2 hours TBA. Experience in reading music is recommended. D. Conn.
An elementary, self-contained introduction to music theory emphasizing fundamental musical techniques, theoretical concepts, and their application. Intervals, scales, triads; basic concepts of tonality; extensive listening to music in various styles; analysis of representative works of Bach, Mozart, Haydn, and Beethoven.

[MUSIC 107 Hildegard to Handel # (IV)
Fall. 3 credits. Prerequisite: ability to read music or concurrent enrollment in MUSIC 100. Not offered 2001–2002. N. Zaslaw.
The music of Western Europe from the Middle Ages through the Baroque period. Starting from Gregorian chant and the monophonic works of Hildegard von Bingen, this course surveys composers and repertoires such as the troubadors, the Notre Dame School, Renaissance sacred polyphony, madrigals, the dance suite, concertos, cantatas, and ends in the early eighteenth century with works by Vivaldi, Bach, and Handel.]

MUSIC 108 Mozart to Minimalism (IV)
Fall. 3 credits. Prerequisite: ability to read music or concurrent enrollment in MUSIC 100. N. Zaslaw.
A survey of Western art music in many genres from the second half of the eighteenth century to the present. Composers whose music is studied include Haydn, Mozart, Beethoven, Schumann, Mendelssohn, Berlioz, Chopin, Wagner, Verdi, Liszt, Brahms, Mahler, Debussy, Strauss, Stravinsky, Bartók, Ives, Webern, Messiaen, Copland, Bernstein, Carter, Stucky, and Sierra.

Music Theory

Students contemplating the music major are strongly advised to take MUSIC 151, 152, 153, and 154 in the freshman year; in any case MUSIC 152 and 154 must be completed no later than the end of the sophomore year.

MUSIC 151 Tonal Theory I (IV)
Fall. 3 credits. Prerequisites: admission by departmental placement exam and concurrent enrollment in or previous credit for MUSIC 153, or equivalent. Intended for students expecting to major in music and other qualified students. B. Robison.
Detailed study of the fundamental elements of tonal music: rhythm, scales, intervals, triads; melodic principles and 2-part counterpoint; diatonic harmony and 4-part voice leading in root position and first inversion; and analysis of phrase and period structure.

MUSIC 152 Tonal Theory II (IV)
Spring. 3 credits. Prerequisites: MUSIC 151 and 153 or equivalent, and concurrent enrollment in or previous credit for MUSIC 154. Intended for students expecting to major in music and other qualified students. A grade of B- or better in MUSIC 152 is required for admission to the music major. B. Robison.
Continued study of voice leading and harmonic progression, including diatonic modulation; analysis of binary and ternary forms.

MUSIC 153 Musicianship I
Fall. 2 credits. Prerequisite: concurrent enrollment in or previous credit for MUSIC 151. Intended for students expecting to major in music and other qualified students. 3 hrs. TBA. B. Robison.
Sight singing: diatonic melodies in treble, alto, and bass clefs. Keyboard: scales, triads, seventh chords, short diatonic chord progressions. Dictation: intervals, rhythms; short diatonic melodies; short diatonic chorale phrases. Score reading: 2 parts using treble, alto, and bass clefs. Musical terms: tempo markings and rhythmic terminology.

MUSIC 154 Musicianship II
Spring. 2 credits. Prerequisite: concurrent enrollment in or previous credit for MUSIC 152. Intended for students expecting to major in music and other qualified students. A grade of B- or better in MUSIC 154, and failure in none of the individual musicianship components of the course, are required for admission to the music major. 3 hrs. TBA. B. Robison.
Sight singing: longer melodies in 3 clefs, including diatonic modulation. Keyboard: diatonic chord progressions and sequences. Dictation: intervals, rhythms; longer melodies; chorale phrases with diatonic modulation. Score reading: 3 parts using treble, alto, and bass clefs. Musical terms: nuance and expression marks.

[MUSIC 239 Introduction to Improvisational Theory
Spring. 2 credits. Prerequisite: permission of instructor. Intended for performers in "jazz" and related styles. Not offered 2001–2002. Staff.
Covers tonal, modal, and blues harmonic resources, and the formal structures in which they are embodied. Development of improvisational skills and creation of spontaneous compositions.]

MUSIC 251 Tonal Theory III (IV)
Fall. 3 credits. Prerequisites: MUSIC 152 and 154 or equivalent, and concurrent enrollment in MUSIC 253. J. Webster.
Continuation of diatonic and introduction to chromatic harmony; species counterpoint; composition in small forms.

MUSIC 252 Tonal Theory IV (IV)
Spring. 3 credits. Prerequisites: MUSIC 251 and 253 or equivalent, and concurrent enrollment in MUSIC 254. K. Tan.
Study of and composition in larger forms, including sonata form; systematic study of chromatic harmony, voice-leading, and modulation; composition in chromatic style.

MUSIC 253 Musicianship III
Fall. 2 credits. Prerequisite: concurrent enrollment in or previous credit for MUSIC 251. 2 hours TBA. J. Webster.
Sight singing: melodies with chromaticism in treble, alto, tenor, and bass clefs. Keyboard: diatonic modulation, chromatic chords. Dictation: melodies with modulation; chorale phrases with secondary dominants and other chromatic chords. Score reading: 4 parts using treble, alto, tenor, and bass clefs. Musical terms: orchestral ranges, terms, clefs, and transpositions.

MUSIC 254 Musicianship IV
Spring. 2 credits. Prerequisite: concurrent enrollment in or previous credit for MUSIC 252. 2 hours TBA. K. Tan.
Sight singing: melodies in 4 clefs, including modality and chromatic modulation. Keyboard: chromatic sequences, chromatic modulations, improvised modulations employing diatonic pivot chords. Dictation: intervals, rhythms, short melodies, and short, diatonic chorale phrases. Score reading: 4 parts, including transposing instruments. Musical terms: other terms in French, German, and Italian.

MUSIC 351 Materials of Twentieth-Century Music (IV)
Fall. 3 credits. Prerequisite: MUSIC 252 and 254 or equivalent, and concurrent enrollment in MUSIC 353. S. Stucky.
Introduction to some techniques of twentieth-century music including extended tonality, modes, twelve-tone technique, set theory, and new approaches to form and rhythm. Analysis of representative works by Debussy, Bartók, Webern, Hindemith, Schoenberg, Stravinsky, and others.

MUSIC 353 Musicianship V
Fall. 2 credits. Prerequisite: concurrent enrollment in or previous credit for MUSIC 351. 2 hours TBA. S. Stucky.
Sight singing: advanced chromatic, twelve-tone, and atonal melodies in 4 clefs. Keyboard: continued chromatic harmony; improvised chromatic modulations. Dictation: continued chromatic harmony; atonal sets and melodies; 2-part counterpoint. Score reading: 4 clefs, transpositions. Music terms: twentieth-century terms.

[MUSIC 451 Counterpoint
Spring. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. Not offered 2001–2002. S. Stucky.
Composition in the polyphonic vocal style of the late Renaissance.]

[MUSIC 452 Topics in Music Analysis
Spring. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. Not offered 2001–2002. J. Webster.
A survey of important analytical approaches to tonal music, including thematic-motivic relations, phrase-rhythm, large-scale paragraph construction, structural-tonal voice-leading, and relations among the movements in a multimovement work.]

[MUSIC 453 Introduction to Improvisational Theory
Spring. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. Not offered 2001–2002. Staff.
Study and performance of tonal, modal, and blues harmonic resources; introduction to the formal structures in which these resources are embodied. Includes ear training, work at the keyboard, composing short pieces, and analyzing selected representative works of popular music and African-American art music from 1940 to 1970.]

MUSIC 454 Composition (IV)
Fall. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. R. Sierra.
Study of music composition through the use of traditional forms such as variation and sonata. The student is required to write original pieces for solo and chamber ensembles.

MUSIC 455 Conducting (IV)
Spring. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. S. Tucker.
Covers fundamentals of score reading, score analysis, rehearsal procedures and conducting technique; instrumental and choral contexts.

[MUSIC 456 Orchestration
Spring. 4 credits. Prerequisite: MUSIC 251 or permission of instructor. Not offered 2001–2002. R. Sierra.
Orchestration based on nineteenth- and twentieth-century models.]

Music in History and Culture

[MUSIC 221 History of Rock Music (also AM ST 223) (IV)
Spring. 3 credits. No previous training in music required. Not offered 2001–2002. J. Peraino.
This course examines the development and cultural significance of rock music from its origins in blues, gospel, and Tin Pan Alley up to present-day genres of alternative rock and hip hop.]

MUSIC 222 A Survey of Jazz (also AM ST 222) (IV)
Fall. 3 credits. Enrollment limited. S. Pond.
This course addresses jazz from two perspectives: the various sounds of jazz, as well as the historical streams—musical and cultural—which have contributed to its development. The historical focus locates jazz as an expression of culture. We investigate how jazz affects and is affected by notions of ethnicity, class, nationalism, gender, art, and genre. We examine what has changed over time and try to understand why. Throughout we focus our inquiry through listening to recordings, studying writings about music by musicians and nonmusicians, learning to listen with new ears, experiencing jazz hands-on, and collaborating to add to the body of literature on jazz.

MUSIC 245 Gamelan in Indonesian History and Cultures @ (IV)
Fall or spring. 3 credits. Permission of instructor. No previous knowledge of musical notation or performance experience necessary. M. Hatch, fall; staff, spring.
An introduction to Indonesia through its art. Elementary techniques of performance on the Javanese *gamelan*; a general introduction to Indonesian history and cultures, and the socio-cultural contexts for the arts there. Several short papers and one longer research report are required.

MUSIC 261 Bach and Handel # (IV)
Fall. 3 credits. Prerequisite: any 3-credit course in music or permission of instructor. D. Yearsley.
Bach's music, product of a provincial life, and Handel's music, product of a cosmopolitan life, are compared. Genres studied include works for keyboard instruments, chamber music, concertos, cantatas, operas, oratorios, anthems, and esoterica.

MUSIC 262 Haydn and Mozart # (IV)
Spring. 3 credits. Prerequisite: any 3-credit course in music or permission of instructor. J. Webster.
Music for courts, theaters, churches, concerts, dancing, marching, public and private ceremonies, and domestic use by two extraordinarily different musical personalities who were friends, is explored in its historical and socio-cultural contexts.

[MUSIC 263 Beethoven # (IV)
Spring. 3 credits. Prerequisite: any 3-credit course in music or permission of instructor. Not offered 2001–2002. J. Webster.
A survey of Beethoven's life, works, and influence. While the primary focus is his musical style and its development, the course also covers social-cultural factors and the psychology and reception of genius.]

[MUSIC 264 Musical Romantics # (IV)
Spring. 3 credits. Prerequisite: any 3-credit course in music or permission of instructor. Not offered 2001–2002. D. Rosen.
This survey of music from 1815 to 1900 is divided into five segments focusing on five composers (Schubert, Berlioz, Verdi, Wagner, and Mahler) and two or three segments on broader topics, such as musical nationalism in Russia, fin de siècle Vienna, the art song, and the history of the piano and its music.]

MUSIC 274 Opera # (IV)
Fall. 3 credits. D. Rosen.
An introduction to major works of the operatic repertory, with discussion of texts and theatrical performances as well as music. Video recordings are an integral part of the course; trips to live performances are scheduled where possible.

[MUSIC 275 Choral Sounds # (IV)
Spring. 3 credits. Prerequisite: ability to read music or concurrent enrollment in MUSIC 100. Not offered 2001–2002. R. Harris-Warrick.
This course examines representative works composed for group singing, primarily from the Western choral tradition, but also including folk and popular styles, from the

Middle Ages to the twentieth century. Class includes discussion of performance practices as well as historical and stylistic issues, and is integrated with local concert offerings.]

MUSIC 276 The Orchestra and Its Music # (IV)
Spring. 3 credits. Prerequisite: any 3-credit music course or permission of instructor. N. Zaslaw.
The music of, and the social structures supporting, large instrumental ensembles in the Western world, including: Italian court festivals of the sixteenth century, string bands of the seventeenth century, Lully's ascendency at Paris and Versailles, and music of Purcell, Corelli, Vivaldi, Bach, Handel, Haydn, Mozart, Beethoven, Schubert, Schumann, Mendelssohn, Berlioz, Liszt, Wagner, Brahms, Tchaikovsky, Bruckner, Mahler, Strauss, Stravinsky, Schoenberg, Webern, Bartók, Shostakovich, Messiaen, Copland, Carter, Tower, Stucky, Sierra, and others.

[MUSIC 277 The Piano and Its Music (IV)
Fall or spring. 3 credits. Prerequisite: 1 semester of music theory (MUSIC 105, an equivalent course, or equivalent experience) or permission of the instructors. Not offered 2001–2002. D. Rosen and M. Bilson.
Representative masterpieces of the piano repertoire from J. S. Bach to the present, placed in the context of the instruments for which they were written and the social structures mediating their production. Thus three different historical approaches are interwoven: (1) the history of music written for the piano and its predecessors, the harpsichord and clavichord; (2) the development of the piano from these predecessors, through Mozart's Stein piano, the pianos of Beethoven, Chopin, Liszt, and Brahms, up to today's Steinway; and (3) the social history of the piano.]

MUSIC 372 Mind and Memory (also ENGL 301, S HUM 301, and THETR 301) (IV)
Spring. 4 credits. J. Morgenroth.
See THETR 301 for description.

Music History Courses for Majors and Qualified NonMajors

MUSIC 207 Survey of Western Music I # (IV)
Fall. 3 credits. Prerequisite: MUSIC 151/153, concurrent enrollment in 151/153, or permission of instructor. J. Peraino.
A survey of Western music and its social contexts from the beginning of notation (circa 900) to 1700. Topics include sacred chant, secular song, polyphony, madrigals, early opera, and the development of independent instrumental music. The course emphasizes listening and comprehension of genres and styles, and is intended for music majors and qualified non-majors.

MUSIC 208 Survey of Western Music II # (IV)
Spring. 3 credits. Prerequisite: MUSIC 152/154, concurrent enrollment in 152/154, or permission of instructor. N. Zaslaw.
A survey of Western music and its social contexts from 1700 to the present. Topics include the decline of church music, the rise of public concerts and opera, the evolution of domestic music-making, and the influence of electronic media upon acoustical traditions. The course, which emphasizes listening and comprehension of genres and styles, is intended for music majors and qualified non-majors.

[MUSIC 300 Proseminar in Musicology (IV)
4 credits. Not offered 2001–2002. Staff.
Introduction to methods in musicology, including historiography, criticism, approaches to vernacular and non-western musics, and gender studies.]

[MUSIC 374 Opera and Culture (also GERST 374 and ITALA 374) (IV)
Spring. 4 credits. Prerequisite: any 3-credit music course or proficiency in German or Italian. Not offered 2001–2002. A. Groos.
See GERST 374 for description.]

[MUSIC 381 Music in Western Europe to 1700 # (IV)
Fall. 4 credits. Prerquisite: MUSIC 152 or permission of instructor. Not offered 2001–2002. J. Peraino.
Western European music from the Middle Ages to the early Baroque, including Gregorian chant, secular monophony, the development of polyphony, the birth of opera, and the rise of independent instrumental music.]

MUSIC 382 Music of the Eighteenth Century # (IV)
Spring. 4 credits. Prerequisite: MUSIC 152 or permission of instructor. J. Webster.
Music in Western and Central Europe and North America from Bach, Handel, and Vivaldi to Haydn and Mozart, including comic and serious opera, church music, concert music, and social music.

[MUSIC 383 Music of the Nineteenth Century # (IV)
Fall. 4 credits. Prerequisite: MUSIC 152 or permission of instructor. Not offered 2001–2002. D. Rosen.
A chronological survey of nineteenth-century music from Beethoven through Puccini including reference to its cultural and historical context.]

[MUSIC 384 Music of the Twentieth Century (IV)
Spring. 4 credits. Prerequisite: MUSIC 152 or permission of instructor. Not offered 2001–2002. S. Stucky.
Covers movements, schools, and styles in "classical" music from the turn of the century to the present. Includes extensive listening and reading assignments for historical breadth; detailed attention to representative works for analytical depth.]

MUSIC 386 Topics in Popular Music and Jazz (IV)
Fall. 4 credits. Prerequisite: MUSIC 152/154. S. Pond.
Topic: Post-Bebop Jazz to 1965. This course examines a cluster of jazz developments in the aftermath of the Bebop Revolution, from the late 1940s to the mid-1960s, from historical, cultural, and analytical viewpoints. A special focus is the complex of styles known as Hard Bop. The course also discusses the negotiation in jazz of Western European- and African-based aesthetics, key personalities of the time, compositional and improvisational developments, the music industry, and cultural politics of this rich period of jazz history. Throughout, we are attentive to the myriad musical streams that grew out of this time, and assess the historical importance this period has assumed in retrospect.

[MUSIC 388 Historical Performance Practicum # (IV)
Spring. 4 credits. Prerequisite: MUSIC 152 or permission of instructor. Not offered 2001–2002. M. Bilson.
The study of eighteenth- and nineteenth-century instrumental performance practices, with special emphasis on the string quartets of Haydn and the piano trios of Schubert. Open to qualified performers.]

[MUSIC 390 Culture of Renaissance II (also COM L 362, ENGL 325, HIST 364 ART H 351) # (III or IV)
Spring. 4 credits. Plus discussion section. Not offered 2001–2002. W. Kennedy and C. Kaske.
See COM L 362 for description.]

MUSIC 398–399 Independent Study in Music History
398, fall; 399, spring. 4 credits. Prerequisite: MUSIC 152 and permission of instructor. Staff.
Advanced study of various topics in music history. Students enrolling in MUSIC 398–399 participate in, but do not register for, an approved 200-level music history course and, in addition, pursue independent research and writing projects.

[MUSIC 400 Senior Seminar
4 credits. Not offered 2001–2002. Staff.]

MUSIC 410 Music and Monstrous Imaginings # (IV)
Fall. 4 credits. A. Richards.
This seminar explores the limits of the imaginary in the eighteenth- and nineteenth-century culture, from theories of fantasy, unreason, and "monstrous imagining" to freak shows, virtuosi, and illusionists. Focusing on visual, literary, and musical phantasmagoria, we investigate the performance of the uncanny (Paganini and devilish technical feats, Mesmer and the glass harmonica), the gendered imagination and artistic creation (pregnancy and invention), technologies of death and its representation (the guillotine and wax museum, magic lantern shows and automata). Novels by Radcliffe, Lewis, Shelley; instrumental music by C. P. E. Bach, Beethoven, Mendelssohn, Berlioz; opera by Mozart, Weber, Meyerbeer; critical texts from Addison and Steele to Freud and Foucault.

MUSIC 474 Opera, History, Politics, Gender (also HIST 460, WOMNS 454, COM L 459, S HUM 459, ITALA 456) (III or IV)
Spring. 4 credits. M. Steinberg and S. Stewart.
See HIST 460 for description.

[MUSIC 489 African American Music Innovators (also AS&RC 489)
Fall. 4 credits. Permission of instructor. Not offered 2001–2002.]

MUSIC 490 American Musical Theatre (also ENGL 454) (IV)
Spring. 4 credits. S. McMillin.
See ENGL 454 for description.

[MUSIC 492 Music and Queer Identity (IV)
Spring. 4 credits. Prerequisite: MUSIC 152 or permission of instructor. Not offered 2001–2002. J. Peraino.
Throughout history music has been associated with "otherness" in Western cultures.

Appropriately, lesbian and gay individuals and communities have turned to music as a means of expressing and negotiating their "queer" identity within status-quo culture. This course examines how and why music encodes "queerness" by focusing on various musical genres (such as opera, disco, women's music, country) and composer/musicians (such as Franz Schubert, Judy Garland, David Bowie) that have become significant for various lesbian and gay communities. The course also examines the reasons behind the general popularity of queer-coded but "straight-identified" performers such as Elvis Presley, Prince, and Michael Jackson.]

[MUSIC 493 Women and Music (also WOMNS 496) (IV)
Spring. 4 credits. Prerequisite: MUSIC 152 or permission of instructor. Not offered 2001–2002. J. Peraino.
This course introduces the students to a critical examination of women's participation in Western European and American musical traditions. The course focuses on the various subject positions and critical perspectives that women hold in examples of music and writings about music. Of primary importance are the concepts of "objective" vs. "subjective" approaches to the topic of the week. Topics include approaches to history and criticism, women composers, women performers, women as objects, women's music, drag and androgyny, and women as listeners. Students are asked to keep a journal of their reactions to the readings, listening assignments, and class discussions, and to write "objective" and "subjective" formal papers.]

[MUSIC 494 Love, Sex, and Song in Medieval France (also WOMNS 403) (IV)
Spring. 4 credits. Not offered 2001–2002. J. Peraino.
This course explores the cult of courtly love and its inextricable relationship with singing. We focus on secular music and poetry and relevant narratives of Southern and Northern France from the twelfth and thirteenth centuries, and consider issues such as constructions of gender and gender relations, music and sexuality in the Middle Ages, medieval misogyny, women's voices in courtly love lyric, the relationship of words and music, performance context, and reconstruction.]

Independent Study

MUSIC 301–302 Independent Study in Music
301, fall; 302, spring. Credit TBA. Prerequisite: departmental approval. Presupposes experience in the proposed area of study. Staff.

Honors Program

MUSIC 401–402 Honors in Music
401, fall; 402, spring. 4 credits each term. Limited to honors candidates in their senior year. Staff.

Digital Music and New Media

MUSIC 120 Learning Music through Digital Technology (IV)
Fall or spring. 3 credits. Enrollment limited. Prerequisite: permission of instructor. D. Borden.
This course uses selected commercially available technological resources to produce live music. The student is expected to master the Macintosh computer, several music software programs, and several synthesizers using MIDI. The ability to read music is helpful but not necessary. There are no papers to write; homework is presented in three classroom concerts. The final is a live presentation of the student's final project in a concert open to the public.

[MUSIC 220 Learning Counterpoint through Digital Technology
Spring. 3 credits. Enrollment limited. Prerequisite: MUSIC 152 and permission of instructor. Not offered 2001–2002. D. Borden.
This course is a study of traditional contrapuntal techniques from the fourteenth century to the present, with emphasis on invention and fugue. Synthesizers, samplers, MIDI, and music software are covered. There are three classroom concerts, some analysis and a final public concert.]

MUSIC 320 Scoring the Moving Image Using Digital Technology (IV)
Spring. 4 credits. Prerequisite: MUSIC 120 with a grade of B or higher. D. Borden.
Students learn sound design and music composition using MIDI and Digital Audio to enhance images in motion. The course is at least partially collaborative, involving students taking courses in computer animation, film, and dance. In addition, to learn techniques involving synchronizing sound to image, film clips from various sources are used as practice exercises. The final project is a public showing of film computer animation and/or dance performance using the sounds and music provided by the students in this course.

MUSIC 391 Media Arts Studio I (also THETR 391, ART 391, ARCH 391) (IV)
Fall. 3 credits. Permission of instructor.
See THETR 391 for description.

MUSIC 392 Media Arts Studio II (also THETR 392, ART 392, ARCH 392) (IV)
Spring. 3 credits. Permission of instructor.
See THETR 392 for description.

[MUSIC 420 Introduction to MIDI Techniques
Spring. 4 credits. Permission of instructor. Not offered 2001–2002. D. Borden.
This course is an introduction to MIDI for students who are already at an advanced level in music composition. Three composition projects are completed in collaboration with film, dance, and computer animation students.]

Musical Performance

Cornell faculty members offer individual instruction in voice, organ, harpsichord, piano and fortepiano, violin, viola, cello, and some brass and woodwind instruments *to those students advanced enough to do college-level work in these instruments*. Lessons are available by audition only. They may be taken either without credit or, through MUSIC 321–322, with credit. Other instruments may sometimes be studied for credit outside Cornell, but also by audition only (see MUSIC 321h–322h).

Lessons for beginners. The Music Department can recommend outside teachers for those who wish to begin studying voice or an instrument. No credit is available for beginning instruction.

Auditions. Auditions are held at the beginning of each term for lessons for advanced students. Contact the Department of Music office (101 Lincoln Hall) for information.

Fees. The fee for a one-half hour lesson weekly, *without credit*, is $150 per term. For a one-hour lesson (or two half-hour lessons) weekly, *without credit*, the fee is $300. The fee in MUSIC 321–322 for a one-hour lesson (or two half-hour lessons) *for credit* is $225 per term. All fees are nonrefundable once lessons begin, *even if the course is subsequently dropped.*

Scholarships. Music majors receive a scholarship equal to the lesson fee listed above. Members of department-sponsored organizations and ensembles may, with the permission of the director of the organization, receive a scholarship of up to $100 of the Cornell fee for the type of lessons chosen during the term. These scholarships are intended only for lessons in the student's primary performing medium. Scholarship forms, available in the Music Department office, are to be returned to the office *within the first three weeks of classes.*

Practice rooms. Practice-room fees for a room with a **grand piano** are $75 per term for up to 10 hours weekly, with a charge of $10 for each additional hour. A $25 cash deposit must be made for a key to the grand piano practice rooms, $20 of which is refunded upon return of the key. Fees for a room with either an **upright piano** or **drum set** are $60 per term for up to 10 hours weekly, with a charge of $8 for each additional hour, and fees for a room **without a piano** are $25 per term for up to 10 hours weekly. The fee for use of the **pipe organs** is $60 per term for up to 10 hours weekly. All fees are non-refundable and are not prorated.

Earning credit. For every four credits earned in MUSIC 321–322, the student must have earned, or currently be earning, at least three credits in another music course (excluding freshman seminars, MUSIC 321–322, 323–324, 331–343, or 421 through 448). These three credits must be earned prior to, or simultaneously with the first two credits in 321–322; they cannot be applied retroactively. Transfer credit for appropriate music courses already taken elsewhere may be used to satisfy this requirement with the approval of the department chair.

Lessons taken outside Cornell. Under certain conditions, advanced students may earn credit for lessons taken outside Cornell. An audition is required, and no credit can be granted for beginning instruction. For further information, read the description of Music 321h–322h and contact the Music Department office.

MUSIC 321–322 Individual Instruction in Voice, Organ, Harpsichord, Piano, Strings, Woodwinds, and Brass
Prerequisite: advanced students may register only after a successful audition with the instructor, usually scheduled during the first week of classes, and will receive credit only as described under "Earning credit". Students may register for this course in successive years.
Students, at the sole discretion of the instructor, earn two credits each term for a one-hour lesson (or two half-hour lessons) weekly accompanied by an appropriate practice schedule.

MUSIC 321a–322a Individual Instruction in Voice
321a, fall; 322a, spring. 2 credits each term. Prerequisite: successful audition. Limited enrollment. Attendance at weekly studio class required for *all* credit students. J. Kellock.

MUSIC 321b–322b Individual Instruction in Organ
321b, fall; 322b, spring. 2 credits each term. Prerequisite: successful audition. A. Richards.

MUSIC 321c–322c Individual Instruction in Piano
321c fall; 322c, spring. 2 credits each term. Prerequisite: successful audition. X. Bjerken.

MUSIC 321d–322d Individual Instruction in Harpsichord
321d, fall; 322d, spring. 2 credits each term. Prerequisite: successful audition. A. Richards.

MUSIC 321e–322e Individual Instruction in Violin or Viola
321e, fall; 322e, spring. 2 credits each term. Prerequisite: successful audition. K. Tan.

MUSIC 321f–322f Individual Instruction in Cello
321f, fall; 322f, spring. 2 credits each term. Prerequisite: successful audition. H. Hoffman.

MUSIC 321g–322g Individual Instruction in Brass
321g, fall; 322g, spring. 2 credits each term. Prerequisite: successful audition. M. Scatterday.

MUSIC 321h–322h Individual Instruction Outside Cornell
321h, fall; 322h, spring. 2 credits each term. Prerequisite: successful audition. Coordinator: D. Conn.
All the standard orchestral and band instruments, keyboard instruments, guitar and voice may, under certain conditions, be studied for credit with outside teachers. This course is available primarily for the study of instruments not taught at Cornell and when there is limited enrollment in MUSIC 321–322. Prior approval and audition by a member of the faculty in the department is required, and credit may be earned only as described under "Earning credit," above. Additionally, a departmental petition must be completed by the end of the third week of classes. For information and a list of approved teachers, consult the department office, 101 Lincoln Hall.

MUSIC 321i–322i Individual Instruction in Woodwinds
321i, fall; 322i, spring. 2 credits each term. Prerequisite: successful audition. D. Conn.

MUSIC 323–324 Advanced Individual Instruction
323, fall; 324, spring. 4 credits each term. Open only to juniors and seniors majoring in music with a concentration in performance and to graduate students. Majors whose lessons must be taken outside Cornell may apply to the department for financial assistance toward the cost of lessons; $225 per semester is normally awarded to such students.

Musical Organizations and Ensembles

Students may participate in musical organizations and ensembles throughout the year. Permission of the instructor is required, and admission is by audition only (usually at the beginning of each semester), except that the Sage Chapel Choir and the Cornell Gamelan Ensemble are open to all students without prior audition. Registration is permitted in two of these courses simultaneously and students may register in successive years, but no student may earn more than eight credits in these courses. Membership in these musical organizations and ensembles is also open to qualified students who wish to participate without earning credit.

MUSIC 331–332 Sage Chapel Choir
331, fall or summer; 332, spring. 1 credit. No audition for admission. R. Riley.
Open to all students and members of the university. Varied and demanding repertoire. The Sage Chapel Choir sings regularly in the Sunday Service of Worship which is broadcast on 870 WHCU-AM radio, and on special occasions throughout the year.

MUSIC 333–334 Cornell Chorus
333, fall; 334, spring. 1 credit. Prerequisite: permission of instructor. W 5:15–7:15 P.M. plus 2 hours TBA. S. Tucker.
A treble-voice chorus specializing in music for women's voices and in mixed-voice repertory.

MUSIC 335–336 Cornell University Glee Club
335, fall; 336, spring. 1 credit. Prerequisite: permission of instructor. W 7:30–9:30 P.M., plus 2 hours TBA. S. Tucker.
A male-voice chorus specializing in music for men's voices and in mixed-voice repertory.

MUSIC 337 Wind Symphony
Fall. 1 credit. Prerequisite: permission of instructor. M W 4:45–6:30. M. Scatterday and D. Conn.

MUSIC 338 Symphonic Band
Spring. 1 credit. Prerequisite: permission of instructor. M W 4:45–6:30. D. Conn.

MUSIC 339–340 Cornell Jazz Ensembles
339, fall; 340 spring. 1 credit. Prerequisite: permission of instructor. W 6–8 P.M. P. Merrill.

MUSIC 342 Wind Ensemble
Spring. 1 credit. Prerequisite: permission of instructor. M 7:30–9:30 and R 4:45–6:30. M. Scatterday.

MUSIC 343–344 Cornell Symphony Orchestra
343, fall; 344, spring. 1 credit. Prerequisite: permission of instructor. W 7:30–10:00 P.M. J. Hsu.

[MUSIC 345–346 Introduction to the Gamelan @
345 fall; 346 spring. 1 credit. Enrollment limited. Prerequisite: permission of instructor. Not offered 2001–2002.
Concentrated instruction for beginning students in elementary techniques of performance on the Indonesian *gamelan*. MUSIC 245 is a three-credit course that complements the instruction in *gamelan* by an introduction to Indonesian history and cultures.]

MUSIC 421–422 Cornell Chamber Orchestra
421, fall; 422 spring. 1 credit. Prerequisite: permission of instructor. T 5–6:30 P.M. M. Scatterday.
Study and performance of the chamber symphonies of Haydn, Mozart, and their contemporaries.

MUSIC 437–438 Chamber Winds
437, fall; 438, spring. 1 credit each term. Prerequisites: enrollment in Symphonic Band, Wind Symphony or Wind Ensemble in the same semester as this course AND permission of instructor only. M. Scatterday and D. Conn.
A flexible instrumentation ensemble performing original woodwind, brass, and percussion music from Gabrieli brass choirs and Mozart serenades through more contemporary works such as Stravinsky's Octet and new music premiers. The ensemble performs in wind symphony, symphonic band, and wind ensemble concerts in addition to several chamber concerts throughout the year.

MUSIC 439–440 Experimental Lab Ensemble
439, fall; 440, spring. 1 credit each term. Permission of instructor. W 8:30–10:30 P.M. P. Merrill.

MUSIC 441–442 Chamber Music Ensemble
441, fall; 442, spring. 1 credit. Prerequisite: permission of instructor. K. Tan.
Study and perform chamber music works from duos to octets for pianists, string, and wind players.

MUSIC 443–444 Chorale
443, fall; 444, spring. 1 credit each term. Prerequisite: permission of instructor. F 4:30–6:15 P.M. J. Day-O'Connell.
Study and performance of selected choral music for mixed voices.

MUSIC 445–446 Cornell Gamelan Ensemble
445, fall; 446, spring. 1 credit each term. Enrollment limited. Prerequisite: permission of instructor. M. Hatch, fall; staff, spring.
Advanced performance on the Javanese *gamelan*. Tape recordings of *gamelan* and elementary number notation are provided. Some instruction by Indonesian musicians is offered in most years.

MUSIC 447–448 Chamber Singers
447, fall; 448, spring. 1 credit each term. Prerequisite: permission of instructor. Plus 2 hours TBA. Y. Haber.
A mixed-voice chamber choir specializing in Renaissance and twentieth-century music.

Graduate Courses

Open to qualified undergraduates with permission of instructor.

MUSIC 601 Introduction to Bibliography and Research
Fall. 4 credits. M 1:25–4. L. Coral.
This course explores the nature of the discipline and introduces the many types of bibliographic tools, both printed and electronic, needed to pursue research in music.

[MUSIC 602 Analytical Technique
Spring. 4 credits. Not offered 2001–2002. J. Webster.
A critical survey of various analyical methods in current use. Frequent analytical assignments and class presentations.]

[MUSIC 603 Editorial Practice
Spring. 4 credits. Not offered 2001–2002.]

MUSIC 604 Ethnomusicology: Areas of Study and Methods of Analysis
Fall. 4 credits. Open to graduate students in anthropology, linguistics, psychology, sociology, and other cognate fields with permission of instructor. M. Hatch.
Major aspects of research into musical cultures of the world. Problems, theories, and methods, especially those affecting analytical terminology, transcription and analysis of sound events, and fieldwork.

MUSIC 622 Historical Performance Practicum
Spring. 4 credits. M. Bilson.
The study of eighteenth- and nineteenth-century instrumental performance practices, with special emphasis on the string quartets of Haydn and the piano trios of Schubert. Open to qualified performers.

[MUSIC 653 Topics in Tonal Theory and Analysis
Spring. 4 credits. Not offered 2001–2002. J. Webster.]

[MUSIC 654 Topics in Post-Tonal Theory and Analysis
Spring. 4 credits. Not offered 2001–2002.]

MUSIC 657–658 Composition
657, fall; 658, spring. 4 credits each term. F 1:25–4:00 P.M. plus 1 hour TBA. R. Sierra, S. Stucky.

[MUSIC 674 German Opera (also GERST 672)
Spring. 4 credits. Not offered 2001–2002. A. Groos.
See German Studies for description.]

[MUSIC 677 Mozart: His Life, Works, and Times (also GERST 757)
Spring. 4 credits. Not offered 2001–2002. N. Zaslaw.]

[MUSIC 680 Topics in Ethnomusicology
Spring. 4 credits. Not offered 2001–2002. S. Pond.]

MUSIC 681 Seminar in Medieval Music
Fall. 4 credits. J. Peraino.
Topic: Medieval Music and Notation.

[MUSIC 683 Music and Postmodern Critical Theory
Fall. 4 credits. Not offered 2001–2002. J. Peraino.
This course surveys the many critical theories that have been included under the umbrella of "postmodernism," and that have fueled the debate between "old" and "new" styles of musicology. Readings focus on structuralism and poststructuralism, feminist literary criticism, queer theory, and postmodern and postcolonialism, and their application in musicology and ethnomusicology. A broad spectrum of music is examined along with the readings.]

[MUSIC 684 Seminar in Renaissance Music
Fall. 4 credits. Not offered 2001–2002. R. Harris-Warrick.]

MUSIC 686 Seminar in Baroque Music
Spring. 4 credits. D. Yearsley.
Topic: Bach's Clavier-Übung Series and Keyboard Practice in the Mid-18th Century.
This course examines not only the sources, reception, and influence of Bach's published keyboard works (beginning with the Six Partitas of 1731 and culminating with the Goldberg Variations of 1741/2), but also investigates the social contexts, pedagogical approaches, and moral values embodied in these seminal collections.

MUSIC 688 Seminar in Classical Music
Fall. 4 credits. J. Webster.
Topic: Haydn.

[MUSIC 689 Seminar in Music of the Romantic Era
Spring. 4 credits. Not offered 2001–2002. D. Rosen.]

MUSIC 690 Seminar in Music of the Twentieth Century
Spring. 4 credits. R. Sierra.
Topic: Ligeti.

MUSIC 691–692 Historical Performance
691, fall; 692, spring. 4 credits each term. Prerequisite: permission of instructor. Hours TBA. M. Bilson.
Lessons on the major instrument with supplementary study and research on related subjects.

[MUSIC 693 Seminar in Performance Practice
Spring. 4 credits. Not offered 2001–2002. N. Zaslaw.
String bands, orchestral discipline, and orchestral repertories in Paris and Versailles in the seventeenth century and their dissemination in Western Europe. Special emphasis on the music and prefaces of Georg Muffat.]

MUSIC 697–698 Independent Study and Research
697, fall; 698, spring. Credit TBA. Staff.

[MUSIC 785–786 History of Music Theory
785, fall; 786, spring. 4 credits each term. Not offered 2001–2002.]

MUSIC 787 History and Criticism
Spring. 4 credits. A. Richards.

[MUSIC 789 Liturgical Chant in the West
Spring. 4 credits. Not offered 2001–2002.]

MUSIC 901–902 Thesis Research
901, fall; 902, spring. Up to 6 credits each term, TBA. Offered for S-U only.
Limited to doctoral students in music who have passed the Admission-to-Candidacy Exam.

NEAR EASTERN STUDIES

R. Brann, (chair) and director of Graduate Studies (fall); S. Alatout, K. Haines-Eitzen (director of Undergraduate Studies), G. Kadish, D. I. Owen, (director of the Program of Jewish Studies); D. Powers, G. Rendsburg, N. Scharf, M. Segol, S. Shoer, D. Starr, S. Toorawa, director of graduate studies (spring), M. Younes, J. Zorn
Joint faculty: M. Bernal (Emeritus)

The Department

The Department of Near Eastern Studies (360 Rockefeller Hall, 255–6275) offers courses in Near Eastern civilization including archaeology, history, religions, languages, and literatures. These course offerings treat the Near East from the dawn of history to the present and emphasize methods of historical, cultural, and literary analysis. Students are encouraged to take an interdisciplinary approach to the religions and cultures of the region and their articulation during antique, late antique, medieval, and modern times.

Distribution Requirements

Any two Near Eastern Studies history or archaeology courses at the 200, 300, or 400 level that form a reasonable sequence or combination satisfy the distribution requirement in the social sciences/history. Any two Near Eastern Studies civilization or literature courses at the 200, 300, or 400 level that form a reasonable sequence or combination satisfy the distribution requirement in the humanities. NES 197 or NES 251 plus any other Near Eastern studies course will constitute a sequence to fulfill the distribution requirement in either social sciences/history or humanities, depending on the second course used in combination with 197 or 251. All 200- or 300-level language courses may fulfill the humanities requirement.

The Major

The precise sequence and combination of courses chosen to fulfill the major is selected in consultation with the student's adviser. All majors must satisfy the following requirements (no course may be used to satisfy two requirements; S-U options not permitted):

A. Qualification in two Near Eastern languages or proficiency in one.

B. Nine three- or four-credit NES courses, which must include the following:

1. NES 197 or 251.

2. Two 200-level NES survey courses, one whose chronological parameters fall within the period 3000 B.C.E to 600 C.E., and one whose chronological parameters fall within the period 600 C.E. to the present. The following are examples (a complete list can be obtained in the department office):

3000 B.C.E to 600 C.E.

NES 223, Introduction to the Hebrew Bible

NES 261, Ancient Seafaring

NES 229, Introduction to the New Testament

NES 295, Introduction to Christian History

600 C.E. to the present

NES 234, Arabs and Jews: Cultures in Confluence and Conflict: The Pre-Modern Period

NES 235, Arabs and Jews: The Modern Period

NES 250, Muhammad and Mystics in the Literatures of the Islamic World

NES 258, Islamic History 1258–1914

NES 294, Modern History of the Near East

3. At least two NES courses at the 300 level or above (one of which may be NES 301, 302, 311, or 312).

Prospective majors should discuss their plans with the director of undergraduate studies before formally enrolling in the department. To qualify as a major, a cumulative grade average of C or better is required.

Honors. Candidates for the degree of Bachelor of Arts with honors in Near Eastern Studies must fulfill the requirements of the appropriate major study and enroll in the honors course, NES 499, in the fall and spring semesters of their senior year. For admission to the honors program, candidates must have a cumulative average of B+ or better and have demonstrated superior performance overall in Near Eastern Studies courses. After consulting their major adviser, candidates should submit an outline of their proposed honors work to the department **during the second semester of their junior year**.

Study abroad. Near Eastern Studies majors may choose to study in the Near East during their junior year. There are various academic programs in the countries of the Near East that are recognized by the Department of Near Eastern Studies and that allow for the transfer of credit. Archaeological field work on Cornell-sponsored projects in the Near East may also qualify for course credit.

First-Year Writing Seminars

For descriptions, consult the John S. Knight Institute brochure for times, instructors, and descriptions.

Language Courses

NES 101–102 Elementary Modern Hebrew I and II (also JWST 105–106)
101, fall; 102, spring. 6 credits each term. *NES 102 satisfies the language qualification.* Prerequisite for NES 102: 101 or permission of instructor. Enrollment limited to 17 students in each section. S. Shoer.
Intended for beginners. This course provides a thorough grounding in reading, writing, grammar, oral comprehension, and speaking. Students who complete the course are able to function in basic situations in a Hebrew-speaking environment.

NES 105–106 Elementary Hindi-Urdu (also HINDI 101–102)
Fall, spring. 6 credits each term. M. Farooqi.
For description, see HINDI 101–102.

NES 107 Introduction to Urdu Script (also HINDI 125)
Spring. 1 credit. M. Farooqi.
For description, see HINDI 125.

NES 111–112 Elementary Arabic I and II
111, fall; 112, spring. Enrollment limited to 17 in each session. 6 credits each term. *NES 112 satisfies the language qualification.* NES 111 is prerequisite for 112, or permission of instructor. M. Younes.
The course provides a thorough grounding in all language skills: listening, speaking, reading, and writing. It starts with spoken Arabic and gradually integrates Modern Standard Arabic in the form of listening and reading texts. Emphasis is on learning the language through using it in meaningful contexts. Students who successfully completes the two-semester sequence are able to: (1) understand and actively participate in simple conversations involving basic practical and social situations (introductions, greetings, school, home and family, work, simple instructions, etc.); (2) read Arabic material of limited complexity and variety (simple narrative and descriptive texts, directions, etc.); (3) write notes and short letters describing an event or a personal experience. An important objective of the course is to familiarize students with basic facts about the geography, history, and culture of the Arab world.

[NES 123–124 Elementary Biblical Hebrew I & II (also JWST 123–124, RELST 123–124)
123, fall; 124, spring. 3 credits each term. *NES 124 satisfies the language qualification.* Enrollment limited to 17 students. Not offered 2001–2002. Staff.
The course is intended to develop basic proficiency in reading the Hebrew Bible. The first semester emphasizes introductory grammar and vocabulary. The second semester focuses on reading selected passages in the Hebrew Bible, with further development of vocabulary and grammar.]

NES 133–134 Qur'anic and Classical Arabic
133, fall; 134, spring. 4 credits each semester. M. Younes.
This course is designed for students who are interested in reading the language of the Qur'an and *Hadiths* (Sayings of the Prophet) with accuracy and understanding. Authentic texts in the form of chapters from the Qur'an and *Hadiths* are presented and analyzed, and basic grammatical structures are discussed, explained, and practiced systematically. Interested students are encouraged to memorize excerpts from the texts. At the end of the two-semester sequence, the successful student has mastered a working vocabulary of over 1,000 words, correct pronunciation, and the most commonly used grammatical structures. In addition, the course provides the student with a firm foundation on which to build an advanced study of Classical Arabic.

NES 201–202 Intermediate Modern Hebrew I and II (also JWST 201–202) @
201, fall; 202, spring. Enrollment limited to 15 students in each section. 4 credits each term. *NES 201 provides language proficiency.* Prerequisites for NES 201, 102 or permission of instructor; for NES 202, 201 or permission of instructor. N. Scharf.
A sequel to NES 101–102. Continued development of reading, writing, grammar, oral comprehension, and speaking skills. The course introduces Hebrew literature and Israeli culture through the use of texts and audio-visual materials.

NES 211–212 Intermediate Arabic I and II @
211, fall; 212, spring. Enrollment limited to 15 students in each section. 4 credits each term. *NES 211 provides language proficiency.* Prerequisites: for NES 211, one year of Arabic or permission of instructor; for NES 212, 211 or permission of instructor. M. Younes.
A sequel to NES 111–112. Continued development of the four language skills through extensive use of graded materials on a wide variety of topics. Increasing attention is given to developing native-like pronunciation and grammatical accuracy, but the main focus is on developing communication skills. The student who successfully completes 212 is able to: (1) understand and express himself or herself in Arabic in situations beyond the basic needs; (2) read and comprehend written Arabic of average difficulty; (3) write a letter, a summary of a report, or a reading selection. An appreciation of Arabic literature and culture is sought through the use of authentic materials.

NES 301–302 Advanced Modern Hebrew I and II (also JWST 301–302) @ (IV)
301, fall; 302, spring. Limited to 15 students. 4 credits each term. Prerequisite for NES 301: 202 or equivalent, with permission of instructor. Prerequisite for NES 302: 301 or equivalent, with permission of instructor. This sequence may be used to fulfill the humanities distribution requirement in literature. N. Scharf.
Advanced study of Hebrew through the analysis of literary texts and expository prose. This course employs a double perspective: language is viewed through literature and literature through language. Students develop composition skills by studying language structures, idioms, and various registers of style.

NES 311 Advanced Arabic I @ (IV)
Fall. 4 credits. Prerequisite: NES 212 or permission of instructor. Limited to 15 students. D. Starr.
Students are introduced to authentic, unedited Arabic language materials ranging from poems, short stories, and plays to newspaper articles dealing with social, political, and cultural issues. Emphasis is on developing fluency in oral expression through discussions of issues presented in the reading selections. A primary objective of the course is the development of writing skills through free composition exercises in topics of interest to individual students.

NES 312 Advanced Arabic II @ (IV)
Spring. 4 credits. Limited to 15 students. Prerequisite: NES 311, or permission of instructor. S. Toorawa.
This course is a continuation of NES 311 using similar but more challenging materials. There is more focus on the writing skills, the development of native-like pronunciation, and accurate use of grammatical structures than in NES 311. Each student is required to make an oral presentation in Arabic on a topic of his/her choice and submit a written version of the presentation.

NES 313 Classical Arabic Texts (also RELST 313) # @ (IV)
Fall. 4 credits. Prerequisite: NES 212 or equivalent. D. Powers.
This course will introduce students to different genres of literary Arabic. We read, translate and discuss selected texts written in classical

and modern standard Arabic. Review of morphology and grammar.

[NES 330–331 Hieroglyphic Egyptian I and II @ # (IV)
330 fall; 331 spring. 4 credits. Not offered 2001–2002. Staff.]

[NES 333–334 Elementary Akkadian I & II (also NES 633–634) @ # (IV)
333, fall; 334, spring. 4 credits each term. Prerequisite for NES 334: 333 or permission of instructor. Prerequisite for NES 634: 633 or permission of instuctor. Not offered 2001–2002. D. I. Owen.
An introduction to the Semitic language of the Akkadians and Babylonians of ancient Mesopotamia. Utilizing the inductive method, students are rapidly introduced to the grammar and the cuneiform writing system of Akkadian through selected readings in the Code of Hammurapi, the Descent of Ishtar, and the Annals of Sennacherib. Secondary readings in comparative Semitic linguistics, the position of Akkadian in the family of Semitic languages and on the history and culture of Mesopotamia provide a background for study of the language. Knowledge of another Semitic language is helpful but not essential.]

[NES 337–338 Ugaritic I & II (also NES 637–638) @ # (IV)
337, fall; 338, spring. 4 credits. Prerequisite: knowledge of another Semitic language (preferably Hebrew). Not offered 2001–2002. G. Rendsburg.
Study of the language and literature of ancient Ugarit, an important site in northern Canaan. Special attention is paid to the relationships between Ugaritic and Hebrew and between Canaanite literature and the Bible.]

[NES 416 Structure of the Arabic Language (also LING 416)
Spring. 4 credits. Prerequisite: NES 112 or one year of Arabic. Not offered 2001–2002. M. Younes.]

NES 420 Readings in the Hebrew Bible (also JWST 420, RELST 420) @ # (IV)
Fall. 4 credits. Prerequisite: 1 year of biblical or modern Hebrew. Course may be repeated for credit. R. Brann.
An advanced course in reading selected portions of the Hebrew Bible. Emphasis is placed on the philological method, with attention to literary, historical, and comparative concerns.

[NES 433 Introductory Sumerian I (also NES 631) @ # (IV)
Fall. 4 credits each semester. Prerequisite: permission of instructor. Not offered 2001–2002. D. I. Owen.
This course consists of an introduction to the Sumerian cuneiform script and grammar of the third millennium B.C.E. Readings in selected Sumerian economic, legal, and historical inscriptions, a basic introduction to Sumerian grammar and script, linguistic connections, and a survey and discussion of Sumerian civilization and culture. Students who have taken or plan to take Akkadian, Hebrew, or Hittite linguistics or are otherwise interested in the history of language should consider this course.]

[NES 434 Introductory Sumerian II (also NES 632) @ # (IV)
Spring. 4 credits each semester. *Satisfies language qualification.* Prerequisite: NES 433/631. Not offered 2001–2002. D. I. Owen.
Continued study of Sumerian grammar and syntax; further readings in selected Sumerian economic, legal, and historical inscriptions of the late third millennium B.C.E.; additional discussion of Sumerian civilization and culture.]

[NES 435 Aramaic I @ # (IV)
Fall. 4 credits. Prerequisite: knowledge of Hebrew. Enrollment limited to 15 students. Not offered 2001–2002. G. Rendsburg.
A panoply of Aramaic materials is read during the course, including selections from ancient Aramaic inscriptions, the biblical books of Ezra and Daniel, Qumran texts, and the Targumim. Explanations of grammar, syntax, and vocabulary are based on the linguistic data which occur in the readings.]

NES 622 Old Avestan (also LING 629)
Fall and spring. 4 credits. Prerequisite: LING 621. M. Weiss.
For description, see LING 629.

NES 623 Comparative Grammar of Anatolian
Spring. 4 credits. M. Weiss.
For description, see LING 620.

[NES 631 Introductory Sumerian I (also NES 433)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. D. I. Owen.
For description, see NES 433 under Near Eastern Languages.]

[NES 632 Introductory Sumerian II (also NES 434)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. D. I. Owen.
For description, see NES 434 under Near Eastern Languages.]

[NES 633–634 Elementary Akkadian I and II (also NES 333–334)
633, fall; 634, spring. 4 credits each term. Prerequisite for NES 634: 633 or permission of instructor. Not offered 2001–2002. D. I. Owen.
An introduction to the Semitic language of the Akkadians and Babylonians of ancient Mesopotamia. Utilizing the inductive method, students are rapidly introduced to the grammar and the cuneiform writing system of Akkadian through selected readings in the Code of Hammurapi, the Descent of Ishtar, and the Annals of Sennacherib. Secondary readings in comparative Semitic linguistics, the position of Akkadian in the family of Semitic languages and on the history and culture of Mesopotamia provide the background for the study of the language. Knowledge of another Semitic language helpful but not essential.]

[NES 637–638 Ugaritic I & II (also NES 337–338)
637, fall; 638, spring. 4 credits. Prerequisite: knowledge of another Semitic language (preferably Hebrew). Not offered 2001–2002. G. Rendsburg.
Study of the language and literature of ancient Ugarit, an important site in northern Canaan. Special attention is paid to the relationships between Ugaritic and Hebrew and between Canaanite literature and the Bible.]

Archaeology

[NES 261 Ancient Seafaring (also ARKEO 275, JWST 261) @ # (III)
Fall. 3 credits. Enrollment limited to 80 Students. Not offered 2001–2002. D. I. Owen.
A survey of the history and development of archaeology under the sea. Considers the role of nautical technology and seafaring among the maritime peoples of the ancient Mediterranean world—Canaanites, Minoans, Mycenaeans, Phoenicians, Hebrews, Greeks, and Romans—as well as the riverine cultures of Mesopotamia and Egypt. Evidence for maritime trade, economics, exploration and colonization, and the role of the sea in religion and mythology is examined.]

NES 263 Introduction to Biblical History and Archaeology (also ARKEO 263, JWST 263, and RELST 264) @ # (III)
Spring. 3 credits. Enrollment limited to 50 students. J. Zorn.
A survey of the principal archaeological developments in Canaan/Israel from the Neolithic period (ca 9000 B.C.E.) to the Babylonian Exile (586 B.C.E.). Includes an introduction to archaeological methodology used in the reconstruction of ancient cultures, as well as the basic bibliography of the field. Emphasis is placed on the use of archaeological data for understanding major problems in Israelite history and archaeology: such as the dating of the cultural milieu of the patriarchs, the dating and geographical setting of the Exodus and the Israelite conquest, and the origin and history of the Philistines. Special lectures are devoted to topics such as: warfare, cult, food production and storage, writing, and water systems. Recommended for students planning to participate in excavations in Israel.

NES 268 Ancient Egyptian Civilization (also JWST 268, ARKEO 268) @ # (III or IV)
Spring. 3 credits. G. Kadish.
The course surveys the history and culture of pharaonic Egypt from its prehistoric origins down to the conquest by Alexander the Great. Within a chronological framework, the following themes and topics are considered: the development of the Egyptian state (monarchy, administration, ideology); social organization (class, gender and family, slavery); economic factors; empire and international relations; science and technology; and such cultural factors as religion, literature, writing, art and architecture. There is considerable use of ancient texts in translation and slides. This is basically a lecture course, but there is opportunity for questions and clarifications.

NES 360 The Origins of Mesopotamian Civilization (also JWST 360, ARKEO 360) @ # (III or IV)
Fall. 4 Credits. D. I. Owen.
An introduction to the language, literature, history, culture and archaeology of Syro-Mesopotamia in the fourth and third millennia B.C.E. The course focuses on Sumerian civilization from its emergence in the archaeological record in the fourth millennium until its disappearance around 2000 B.C.E. In addition, it emphasizes the parallel development of the Semitic peoples in Syria (Eblaites) and upper Mesopotamia (Akkadians). A special feature of the course will be a basic introduction to the Sumerian language

utilizing original cuneiform tablets in the collection of the Department of Near Eastern Studies.

NES 361 Sumerian Language and Culture (also JWST 361, ARKEO 361) @ # (IV)
Spring. 4 credits. D. I. Owen.
A continuation of NES 360, the course focuses on a more intense introduction to Sumerian language and grammar with additional readings in literature in translation. Particular emphasis is placed on the reading and interpretation of original texts from the Cornell collection and their use in the reconstruction of Mesopotamian history and culture in the third millennium.

[NES 366 The History and Archaeology of the Ancient Near East (also ARKEO 366, JWST 366) @ # (III or IV)
Fall. 4 credits. Prerequisite: ARKEO 100 or permission of instructor. Not offered 2001–2002. D. I. Owen.
A survey of the history and archaeology of the major civilizations of the Near East from the Persian Gulf to Syria and Anatolia. The course covers the time span from the prehistoric period to the Persian conquest. Sumerian, Babylonian, Eblaite, Elamite, West Semitic, Assyrian, and Persian cultures are discussed with particular emphasis on indigenous development and cross-cultural contacts.]

Civilization

[NES 197 Introduction to Near Eastern Civilization (also JWST 197 and RELST 197) @ # (IV)
Fall. 3 credits each term. Not offered 2001–2002. D. I. Owen.]

[NES 244 Introduction to Ancient Judaism (also JWST 244 and RELST 244) @ # (III or IV)
Spring. 3 credits. Not offered 2001–2002. G. Rendsburg.
This course focuses on the development of Judaism as a religion and as a civilization in antiquity. Particular emphasis is placed on theological development culminating in monotheism, the role of the covenant, law and society, sacrifice and prayer as modes of worship, and similar topics. Jewish civilization is placed within the context of ancient civilizations (Canaan, Egypt, Babylon, Persia, Greece, Rome). Texts studied include selections from the Bible, the Apocrypha, the Dead Sea Scrolls, Josephus, and the Mishnah. All readings are in English translation.]

NES 246 Jewish Mysticism (Also RELST 246, JWST 246) @ # (IV)
Fall. 3 credits. M. Segol.
This course introduces students to the body of Jewish Mystical literature—the Kaballah. In this course we study the Kaballah as a literary canon, reading, considering, and analyzing a selection of the core works from the five major periods of Jewish mystical thought. While we survey mystical traditions from the Talmudic period through modernity, the central focus is on the rich medieval stream known as kabbalah. Among the issues explored are: the nature of mystical experience; images of God, world, and Person; sexual and gender symbolism (images of the male and female); constructions of body, mind, and spirit; the problem of evil; problems presence and absence; mysticism, language, and silence; mysticism and community; meditative and ecstatic practices (ranging from visualization to chant, letter combination to modulated breathing); kabbalistic myth and ritual innovation; and kabbalistic interpretations of history. Readings consist of selections from primary sources coupled with complementary selections from Jewish history, comparative religion, and other relevant disciplines. The course is taught in English, and all works are studied in translation.

[NES 251 Judaism, Christianity, and Islam (also JWST 251, RELST 251) @ # (IV)
Fall. 3 credits. Not offered 2001–2002. R. Brann and K. Haines-Eitzen.]

NES 255 Introduction to Islamic Civilization (also HIST 253, RELST 255) @ # (III or IV)
Fall. 3 credits. D. Powers.
We consider the major themes of Islamic civilization as they developed from the lifetime of Muhammad until the twentieth century. While the readings provide the student with the chronology of Islamic History, lectures are devoted to an analysis of thematic units, such as art and architecture, science and cities. The class meets three times weekly, and the classroom format is that of a lecture/discussion in which students are encouraged to participate actively. Lectures are accompanied by slide presentations, when appropriate.

[NES 281 Gender and Society in the Muslim Middle East (also RELST 281, WOMNS 281) @ (III)
Spring. 3 credits. Not offered 2001–2002. Staff.]

[NES 291 Arab Society and Culture (III)
Fall. 3 credits. Enrollment limited to 25 students. Not offered 2001–2002. M. Younes.
The focus of this course is Arab society in the twentieth century. We start with a definition of the term "Arab" and address the issue of whether there is one or several Arab nations. This is followed by a detailed examination of the following topics: the role of religion, history, and language in shaping modern Arab society; Arab identity and the development of Arab nationalism; the Arab-Israeli conflict; the conflict between secular and religious movements; the political systems of the different Arab countries; ethnic and religious groups; the distribution of resources (the super-rich and the destitute) and resulting conflicts; education; and finally the family and the status of women. No prior knowledge of Arabic is required.]

NES 339 Islamic Spain: Culture and Society (also JWST 339, COM L 334, RELST 334, SPAN L 339/699, NES 639) @ # (IV)
Fall. 4 credits. R. Brann.
This course examines the culture and society of al-Andalus (Islamic Spain) from 711, when Islam arrived in Iberia, until 1492 and the demise of Nasrid Granada. Through extensive discussion and analysis of Arabic, Latin, and Hebrew primary documents and literary texts of various genres (in translation), the course challenges ideological bases of conventional thinking regarding the social, political, and cultural identity of medieval "Spain." Among other things, the class investigates the origins of lyric poetry, the relationships among the various confessional and ethnic communities in al-Andalus and the problems involved in Mozarabic Christian and Andalusi Jewish subcultural adaptations of Andalusi Arabo-Islamic culture.

[NES 351 Law, Society, and Culture in the Middle East, 1200–1500 (also NES 651, RELST 350, HIST 372/652) @ # (III)
Fall. 4 credits. Enrollment limited to 25 students. Not offered 2001–2002. D. Powers.
After surveying the historical development of Islamic Law, the seminar focuses on the structure and function of the Islamic legal system in the thirteenth, fourteenth, and fifteenth centuries, using legal documents, judicial opinions, and court cases (all in English translation) to elicit major themes and issues; (e.g., the Marital regime, women and property, social hierarchies, law, and the public sphere).]

NES 357 Islamic Law and Society (also RELST 356) @ # (III)
Spring. 4 credits. D. Powers.
The *Shari'ah*, or sacred law of Islam, embodies the totality of God's commands that regulate the life of every Muslim in all its aspects. The *Shari'ah* comprises on an equal basis ordinances regarding worship and ritual as well as political and, in Western terms, strictly legal rules. This course examines the relationship between the *Shari'ah* and the major social, economic, and political institutions of Islamic society. Topics discussed include the status of women, slaves, and non-Muslims; attitudes toward the economy and the arts; the significance of *jihad* (holy war); the nature of the Muslim city; and the relationship between the religious establishment and the government. Attention is given to the function of the *Shari'ah* in the modern world, with special reference to the problems and challenges of legal reform.

[NES 363 Society and Law in the Ancient Near East (also JWST 363) @ # (III)
Fall. 4 credits. Not offered 2001–2002. Staff.]

[NES 371 A Mediterranean Society, and Its Culture: The Jews and Judaism under Classical Islam (also JWST 371, RELST 371, COM L 371) @ # (IV)
Spring. 4 credits. Not offered 2001–2002. R. Brann.
The Jewish encounter with Islamic civilization (tenth through thirteenth centuries) reshaped the conditions of Jewish existence in Mediterranean lands and redefined the culture and world-view of rabbinic Judaism. The seminar studies these transformations by learning how to read travelers accounts and documentary materials (personal correspondence, court records, economic and communal registers) preserved in the so-called "Cairo Genizah." We also examine selected texts produced by and for the benefit of Jewish literary and religious intellectuals, such as Saadiah Gaon, Solomon ibn Gabirol, Judah Halevi, and Moses Maimonides.]

[NES 464 The Herodotean Moment (also GOVT 454, HIST 454) # (III)
Spring. 4 credits. Not offered 2001–2002. M. Bernal.]

[NES 639 Islamic Spain: Culture and Society (also NES 339, JWST 339, COM L 334, RELST 334, SPAN L 339/699)
Fall. 4 credits. Not offered 2001–2002. R. Brann.
This course examines the culture and society of al-Andalus (Islamic Spain) from 711, when Islam arrived in Iberia, until 1492 and the demise of Nasrid Granada. Through extensive discussion and analysis of Arabic, Latin, and Hebrew primary documents and literary texts of various genres (in translation), the course challenges ideological bases of conventional thinking regarding the social, political, and cultural identity of medieval "Spain." Among other things, the class investigates the origins of lyric poetry, the relationships among the various confessional and ethnic communities in al-Andalus and the problems involved in Mozarabic Christian and Andalusi Jewish subcultural adaptations of Andalusi Arabo-Islamic culture.]

[NES 651 Law, Society and Culture in the Middle East, 1200–1500 (also NES 351, RELST 350, HIST 372/652)
Fall. 4 credits. Limited to 25 students. Not offered 2001–2002. Staff.
For description, see NES 351.]

[NES 696 Conceptualizing Cultural Contact (also GERST 696, COM L 696)
Spring. 4 credits. Not offered 2001–2002. Staff.]

History

[NES 239 Cultural History of the Jews of Spain (also JWST 239, COM L 239, RELST 239, SPAN L 239) # (IV)
Spring. 3 credits. Not offered 2001–2002. Staff.
A survey of the cultural history of the Jews in Spain from the late Visigothic period until the converso crisis of the fourteenth and fifteenth centuries and the Expulsion, focusing on the interaction of Jewish with Muslim and Christian cultures and the stable yet evolving sense of a "Sefardi" identity. The course establishes historical and literary-critical frames for reading primary sources in translation, including secular and synagogal poetry, philosophy and kabbalah, biblical hermeneutics, historiography, polemics, and other genres.]

[NES 261 Ancient Seafaring (also JWST 261, ARKEO 275) @ # III
Fall. 3 credits. Not offered 2001–2002. D. I. Owen.]

NES 263 Introduction to Biblical History and Archaeology (also ARKEO 263, JWST 263, RELST 264) @ # III
Spring. 3 credits. Enrollment limited to 50 students. J. Zorn.
For description, see NES 263 under Near Eastern Archaeology.

[NES 266 Jerusalem through the Ages (also JWST 266, ARKEO 266, RELST 266) @ # (III)
Fall. 3 credits. Not offered 2001–2002. J. Zorn.]

[NES 290 History of Zionism and the Birth of Israel (also JWST 290, HIST 267) @ (III)
Spring. 3 credits. Not offered 2001–2002. Staff.]

NES 294 Imagining the Modern Middle East (also JWST 294, GOVT 358, HIST 288) @ (III)
Fall. 4 credits. Fulfills the college distribution requirement in history or the social sciences. S. Alatout.
This course traces the emergence of contemporary Middle East back to the political, social, and cultural encounters between "East" and "West". Readings bring together works in the history and politics of the Middle East as well as political theory. Themes include modernization; modern colonial encounters; nationalist responses; the postcolonial state; and Islamic, feminist, and sexual critiques of the postcolonial state.

[NES 295 Introduction to Christian History (also JWST 295, RELST 295, HIST 299) # (III or IV)
Spring. 3 credits. Not offered 2001–2002. K. Haines-Eitzen.
This course offers an introduction of Christianity from the apostle Paul through the seventeenth century, with an emphasis on the diversity of Christian traditions, beliefs, and practices. We explore the origins of Christianity within Judaism in the eastern Mediterranean world, the spread of Christianity, the development of ecclesiastical institutions, the rise and establishment of monasticism, and the vairous controversies that occupied the church throughout its history. The course draws on primary literary sources (from biblical literature to council proceedings, monastic rules, sermons, theological treatises, and biographies) as well as Christian art, inscriptions, music, and manuscripts.]

NES 321 Heresy and Orthodoxy in Early Christianity (also RELST 321) # (IV)
Spring. 4 credits. Limited to 17 students. K. Haines-Eitzen.
In this course we explore the varieties of Christian thought and practice from the first through the fourth centuries. In its earliest centuries, Christianity consisted of a diverse range of movements, each of which was considered "heretical" by its opponents, one of which came to dominate all the others and so earned for itself the designation "orthodoxy." The "heresies" we study include Adoptionism, Marcionism, Gnosticism, Montanism, Arianism, and Donatism. Consideration is also given to the ways in which charges of "heresy" intersected with competing views about women in the early Church, the relationship between Judaism and Christianity, the construction of authority, and the content, function, and sacredness of early Christian books.

[NES 351 Law, Society, and Culture in the Middle East, 1200–1500 (also NES 651, RELST 350, HIST 372/652) @ # (III)
Fall. 4 credits. Enrollment limited to 25 students. Not offered 2001–2002. D. Powers.
After surveying the historical development of Islamic Law, the seminar focuses on the structure and function of the Islamic legal system in the thirteenth, fourteenth, and fifteenth centuries, using legal documents, judicial opinions, and court cases (all in English translation) to elicit major themes and issues; (e.g., the Marital regime, women and property, social hierarchies, law, and the public sphere).]

[NES 356 Islamic History: The Age of Ibn Khaldun (also HIST 317) @ # (III)
Spring. 4 credits. Enrollment limited to 15 students. Prerequisite: NES 257 or equivalent. Not offered 2001–2002. D. Powers.]

[NES 366 The History and Archaeology of the Ancient Near East (also ARKEO 366, JWST 366) @ # (III or IV)
Fall. 4 credits. Prerequisite: ARKEO 100 or permission of instructor. Not offered 2001–2002. D. I. Owen.
For description, see Near Eastern Archaeology.]

[NES 393 Religion and Politics in the Middle East (also RELST 393) @ (III)
Fall. 4 credits. Enrollment limited to 25 students. Not offered 2001–2002.]

[NES 395 International Relations of the Middle East (also GOVT 392) @ (III)
Fall. 4 credits. Not offered 2001–2002.]

[NES 397 Arab Israeli Conflict (also JWST 397) (III)
Spring. 4 credits. Enrollment limited to 50 students. Prerequisite: NES 294 or permission of instructor. Not offered 2001–2002. Staff.]

NES 418 Seminar in Islamic History: 600–750 (also HIST 460, NES 618, RELST 418) @ # (III)
Spring. 4 credits. Knowledge of Arabic is desirable, but not required. D. Powers.
An examination of Islamic history from 600-750, with special attention to interpretive issues relating to the career of the Prophet Muhammad; the Arab conquests, the emergence of the Caliphate, conversion to Islam, and the Abbasid revolution. Students read primary sources in English translation, especially *The History of Tabari*.

[NES 651 Law, Society, and Culture in the Middle East, 1200–1500 (also NES 351, RELST 350, HIST 372/652)
Fall. 4 credits. Enrollment limited to 25 students. Not offered 2001–2002. D. Powers.
For description, see NES 351.]

Literature

[NES 223 Introduction to the Hebrew Bible I (also JWST 223, RELST 223) @ # (IV)
Fall. 3 credits. Not offered 2001–2002. G. Rendsburg.
This is the first course of a two-semester sequence. The main goal is to introduce students to the literature of the Hebrew Bible, which is accomplished by concentrating on the Torah and the historical material in Joshua through Samuel, that is, the material which covers the period from Israel's origins through King David. Emphasis is placed on literary, historical, and theological matters. Special use is made of the numerous archaeological discoveries that have advanced our knowledge of ancient Israel. As such, the Bible is studied against the backdrop of ancient Near Eastern literature, history, religion, mythology, and law.]

[NES 224 Introduction to the Hebrew Bible II (also JWST 224, RELST 224) @ # (IV)
Fall. 3 credits. Not offered 2001–2002. G. Rendsburg.

This is the second of a two-semester sequence, but one does not need to take NES 223 in order to take this course. The main goal is to introduce students to the literature of the Hebrew Bible. This is accomplished by concentrating on the historical material in Kings, the books of the Prophets, and the book of Job, that is, the material which covers the period from King Solomon through the end of the biblical era. Emphasis is placed on literary, historical, and theological matters. Special use is made of the numerous archaeological discoveries that have advanced our knowledge of ancient Israel. As such, the Bible is studied against the backdrop of ancient Near Eastern literature, history, religion, and mythology. (Note: students who have taken NES 227, Introduction to the Prophets are ineligible to take this course; NES 224 is intended to replace NES 227). Students interested in a one-credit option, reading the texts covered in class in the original Hebrew, should also enroll in NES 325.]

[NES 227 The Bible and the Literature of the Ancient Near East (also JWST 227 and RELST 227) @ # (IV)

Spring. 3 credits. Not offered 2001–2002. J. Zorn.

The Hebrew Scriptures are a composite work containing a wide array of literary forms: historical works, prophetic texts, wisdom literature, and so on. These works themselves were compiled form an even wider assortment of text types: cosmologies, folk tales, love songs, palace records, treaties, letters, and more. These texts were not written in a cultural vacuum but find a home in the literary work of Israel's neighbors, including the Mesopotamians, Egyptians, Hittites, and others. This course examines the different literary genres found in the Hebrew Scriptures in comparison with similar material from the ancient Near East. The intent is to clarify the interpretation, dating, and purpose of the biblical material.]

[NES 229 Introduction to the New Testament (also RELST 229 and JWST 229) @ # (IV)

Fall. 3 credits. Not offered 2001–2002. K. Haines-Eitzen.

This course provides a literary and historical introduction to the earliest Christian writings, most of which eventually came to be included in the New Testament. Through the lens of the gospel narratives and earliest Christian letters, especially those of Paul, the course explores the rich diversity of the early Christian movement, from its Jewish roots in first century Palestine through its development and spread to Asia Minor and beyond. Careful consideration is given to the political, economic, social, cultural, and religious circumstances that gave rise to the Jesus movement, as well as those that facilitated the emergence of various manifestations of early Christian beliefs and practices. (Students who have had at least one year of Greek and would like to participate in a one-credit, New Testament Greek reading weekly seminar should also enroll in NES 329).]

NES 235 Jews and Arabs in Conflict: The Modern Period (also JWST 235) @ (III)

Spring. 3 credits. D. Starr.

This course traces the history and representations of Arab-Jewish relations from the late 19th Century to the present. The majority of class time is devoted to discussing literary works and films by Jews from Arab countries, Israelis from a variety of backgrounds, Palestinians including Palestinians in Israel, under Israeli occupation, and in the diaspora and Arabs representing a variety of other nationalities. Primary source documents and critical studies provide the historical, cultural, and political frameworks for our discussions. Topics covered include: Zionism, Arab nationalism, minority relations, establishment of the State of Israel, Palestinian dispersion, Arab-Israeli wars, terrorism, peace negotiations, establishment of the Palestinian Authority, post-Zionism, and normalization.

[NES 236 Israel: Literature and Society (also JWST 236, COM L 246) @ (IV)

Fall. 3 credits. Not offered 2001–2002. Staff.]

NES 239 Cultural History of the Jews of Spain (also JWST 239, COM L 239, RELST 239, SPAN L 239) # (IV)

Spring. 3 credits. M. Segol.

For description, see NES 239 under Near Eastern History.

[NES 250 Muhammad and Mystics in the Literatures of the Islamic World (also RELST 254, COM L 250) @ (IV)

Spring. 3 credits. Not offered 2001–2002. S. Toorawa.

The life of the Prophet Muhammad and the teachings of Muslim mystics (sufis) have provided material and inspiration for numerous writers of the Islamic world. We use our readings, in English translation, of works in Arabic, Malay, Panjabi, Persian, Swahili, Turkish, and Urdu, to help us interrogate the ways in which Muhammad, mystics, and mysticism have shaped religion, literature, and society.]

NES 256 Introduction to the Q'uran (also COM L 256, RELST 213 and JWST 256) @ # (IV)

Spring. 3 credits. S. Toorawa.

In 7th century Arabia, a merchant by the name of Muhammad shared with his followers the Book of God as revealed to him through the archangel Gabriel. That book is now a source of spiritual guidance and law for over a billion people the world over. In this course, a literary, historical and religious introduction to the Quran, we explore: the circumstances of the Quran's revelation; its written compilation; its narrative structure; its major themes; its connections to and departures from the Hebrew Bible and the New Testament; Quranic commentary; translation and the problems associated with it; the impact of the Quran on political and religious thought; and the influence of the Quran on literature.

[NES 299 Hebrew Bible and Arabic Qur'an in Comparative Perspective (also RELST 299, COM L 299, JWST 299) @ # (IV)

Spring. 3 credits. Not offered 2001–2002. R. Brann.

This course examines (in translation) the Hebrew Bible and Arabic Qur'an as foundational documents of their respective religious traditions and as the texts by which their corresponding religious communities came to constitute and define themselves. The approach in this course is comparative, analyzing literary aspects of the parallel narrative traditions on Creation, the Noah story, Abraham/Ibrahim and his sons, the Joseph/Yusuf cycle, as well as postbiblical and Islamic elaborations of the Solomon/Sheba material. The class also discusses the concepts of revelation, prophethood, community, and notions of history, eschatology, and apocalypse set forth in the Hebrew Bible and Arabic Qur'an. The problematic nature of revealed scripture in monotheistic religion and the limited relevance of the idea of "influence" in the Near Eastern context is also studied.]

NES 313 Classical Arabic Texts (also RELST 313) @ # (IV)

Fall. 4 credits. Prerequisite: NES 212 or equivalent. D. Powers.

[NES 319 Crime and Conflict in the Modern Arabic Novel (also COM L 319) @ (IV)

Fall. 4 credits. Not offered 2001–2002. S. Toorawa.

In this course we read seven modern Arabic novels in translation in which the themes of crime and conflict are uppermost, including Nobel Laureate Naguib Mahfouz's *The Thief and the Dogs*, Nawal El Saadawi's *Woman at Point Zero*, and Rachid El Daif's *Dear Mister Kawabata*. We complement the readings with three films.]

[NES 320 Women in the Hebrew Bible (also JWST 320, WOMNS 322) @ # (IV)

Spring. 3 credits. Not offered 2001–2002. G. Rendsburg.

This course features stories about women in the Hebrew Bible. Through literary readings of these texts we attempt to understand the portrayal of women (characteristics and roles assigned by male writers); the social reality represented; and the role of narrative in the promotion of ideologies. All texts in English translation. Hebrew texts optional.

There is a one-credit option for students who wish to meet 1 hour/week to read the texts in the Hebrew original (NES 326).]

[NES 323 Reinventing Biblical Narrative (also JWST 323, RELST 323) @ # (IV)

Spring. 4 credits. Not offered 2001–2002. K. Haines-Eitzen.

Narratives, particularly sacred narratives, are not static or fixed but rather infinitely flexible and malleable. Subject to multiple retellings—elaborations, modifications, and deletions—narratives take on lives of their own even after they come to be written down. What happens to sacred stories when they are heard and read by different communities of interpreters? This is the broad question at the heart of this course, which explores the diverse interpretations of biblical narratives—especially the stories and characters in the book of Genesis—found Jewish and Christian literature from the second century B.C.E. through the third century C.E. Writers like the Hellenistic Jewish philosopher Philo and the Jewish historian Josephus, bodies of literature like Jewish and Christian pseudepigrapha and apocrypha, the New Testament, gnostic literature, early rabbinic literature, and patristic writers are sources we investigate in this class.]

[NES 325 Introduction to the Hebrew Bible—Seminar (also JWST 325, RELST 318)

Fall. 1 credit. Not offered 2001–2002. G. Rendsburg.

This is a one-credit option for students who wish to meet one day each week to read the texts covered in class in the original Hebrew. Must be concurrently enrolled in NES 223 or NES 224.]

[NES 326 Women in the Hebrew Bible—Seminar (also JWST 326, WOMNS 326)
Spring. 1 credit. Not offered 2001–2002. G. Rendsburg.
This is a one-credit option for students who wish to meet one hour each week to read the texts in the Hebrew original. Must be concurrently enrolled in NES 320.]

[NES 328 Gnosticism and Early Christianity (also JWST 328, RELST 330) @ # (IV)
Spring. 4 credits. Not offered 2001–2002. K. Haines-Eitzen.
An in-depth exploration of early Christian Gnosticism—its literatures, beliefs, and practices. Early Christian Gnosticism came to be considered heretical by early proto-orthodox Church Fathers. In this course, however, we do not simply read the condemnations written by the opponents of gnostic thought; rather, we focus our attention on reading (in English translation) substantial portions of the texts written by the Gnostics themselves and found at Nag Hammadi, Egypt, in 1945. We explore gnostic ideas about the world, creation, salvation, God, humanity, and the human body, while also attending to issues of gender, asceticism, and scriptural interpretation as they intersect with gnostic thought. To set gnostic literature within a socio-historical context, we discuss other relevant ancient texts and scholarly theories about the Jewish and Hellenistic roots of early Christian Gnosticism.]

[NES 329 Intro to the New Testament—Seminar (also JWST 329, RELST 329)
Fall. 1 credit. Prerequisite: concurrent enrollment (or past enrollment) in NES 229 and 1 year of ancient Greek. Not offered 2001–2002. K. Haines-Eitzen.
A weekly seminar that may be taken in addition to NES 229. The seminar provides an opportunity to read portions of the New Testament and other early Christian writings in Greek. We work on grammatical and textual issues as well as other problems related to translations.]

NES 339 Islamic Spain: Culture and Society (also JWST 339, COM L 334, RELST 334, SPAN L 339/699) @ # (IV)
Fall. 4 credits. R. Brann.
For description, see NES Civilization.

NES 394 Gender, Sexuality, and the Body in Early Christianity (also RELST 394, WOMNS 394, JWST 394) # (IV)
Spring. 4 credits. K. Haines-Eitzen.
Beliefs about gender, sexuality, and the human body were remarkably interwoven with political, religious, and cultural disputes in early Christianity. In this course we explore the construction and representation of gender, sexuality, and the body in various forms of Christianity from the first century through the fourth. Asceticism and celibacy, veiling and unveiling, cross-dressing and Gnostic androgyny, marriage and childbirth, and homosexuality are among the topics considered, and our sources range from the New Testament, early Christian apocrypha, martyrologies, and patristic writings to Greek medical texts, Jewish midrash, Roman inscriptions, and Egyptian erotic and magical spells. Current interdisciplinary and theoretical studies on gender, ideology, sexuality, and power aid us in developing our analytical approaches to the ancient materials.

NES 400 Seminar in Advanced Hebrew (also JWST 400) @
Fall. 4 credits. Prerequisite: NES 302/JWST 302 or permission of instructor. Enrollment limited to 15 students. The course may be repeated for credit with permission of instructor. N. Scharf.
Continuation of work done in NES/JWST 302, with less emphasis on the study of grammar. We will read and discuss texts of cultural relevance, using articles published in Israeli newspapers and works by authors in each of the three principal genres: poetry, theater, and novels.

NES 401 Topics in Modern Hebrew Literature
Spring. 4 credits. D. Starr.
For description, see department.

NES 409 Seasons of Migration (also JWST 409, RELST 409) @ # (IV)
Fall. 4 credits. S. Toorawa.
For description, see S HUM 409.

NES 420 Readings in the Hebrew Bible (also JWST 420 and RELST 420) @ # (IV)
Fall. 4 credits. Prerequisite: 1 year of biblical or modern Hebrew. Course may be repeated for credit. R. Brann.
An advanced course in reading selected portions of the Hebrew Bible. Emphasis is placed on the philological method, with attention to literary, historical, and comparative concerns.

[NES 421 Readings in Biblical Hebrew Poetry (also JWST 421, RELST 421) @ # (IV)
Fall. 4 credits. Prerequisite for NES 421: 1 year of Biblical or Modern Hebrew. Course may be repeated for credit. Not offered 2001–2002. G. Rendsburg.
Advanced course in reading selected poems of the Hebrew Bible. Chapters studied include various Psalms, parts of the Book of Job, various prophetic speeches, and early compositions such as Genesis 49 and Judges 5. Emphasis is placed on the philological method, with attention to literary, historical, and comparative concerns as well.]

[NES 639 Islamic Spain: Culture and Society (also NES 339, JWST 339, COM L 334, RELST 334, SPAN L 339/699)
Fall. 4 credits. Not offered 2001–2002. R. Brann.
This course examines the culture and society of al-Andalus (Islamic Spain) from 711, when Islam arrived in Iberia, until 1492 and the demise of Nasrid Granada. Through extensive discussion and analysis of Arabic, Latin, and Hebrew primary documents and literary texts of various genres (in translation), the course challenges ideological bases of conventional thinking regarding the social, political, and cultural identity of medieval "Spain." Among other things, the class investigates the origins of lyric poetry, the relationships among the various confessional and ethnic communities in al-Andalus and the problems involved in Mozarabic Christian and Andalusi Jewish subcultural adaptations of Andalusi Arabo-Islamic culture.]

NES 491–492 Independent Study, Undergraduate Level
Fall and spring. Variable credit. Prerequisite: permission of instructor. Staff.

NES 499 Independent Study, Honors
Fall and spring. Variable credit. Prerequisite: permission of instructor. Staff.

NES 691–692 Independent Study: Graduate Level
Fall and spring. Variable credit. Prerequisite: permission of instructor. Staff.

The Program of Jewish Studies

The Program of Jewish Studies encompasses a broad spectrum of disciplines that includes civilization, history, language, literature, philology, archaeology and religion. The program offers students the opportunity to take a wide variety of courses in Jewish Studies whose subjects are not represented in the Department of Near Eastern Studies. Students interested in planning a program in Jewish Studies should consult with the director, Professor David I. Owen, 360 Rockefeller Hall. For complete listings and descriptions, see Program of Jewish Studies under "Special Programs and Interdisciplinary Studies."

JWST 105–106 Elementary Modern Hebrew I and II (also NES 101–102)
105, fall; 106, spring. 6 credits each term. Enrollment limited to 15 students. *JWST 106 satisfies language qualification.* S. Shoer.

JWST 201–202 Intermediate Modern Hebrew I and II (also NES 201–202) @
201, fall; 202, spring. 4 credits. Enrollment limited to 15 students. *JWST 201 satisfies language qualification.* N. Scharf.

JWST 235 Jews and Arabs in Conflict: The Modern Period (also NES 235) @ (III)
Spring. 3 credits. D. Starr.
For description, see NES 235.

JWST 239 Cultural History of the Jews of Spain (also NES 239, COM L 239, RELST 239, SPAN L 239) # (IV)
Spring. 3 credits. M. Segol.
For description, see NES 239.

JWST 246 Jewish Mysticism (also RELST 246 and NES 246) @ # (IV)
Fall. 3 credits. M. Segol.
For description, see NES 246.

JWST 256 Introduction to the Q'uran (also RELST 256 and NES 256) @ # (IV)
Spring. 3 credits. S. Toorawa.
For description, see NES 256.

JWST 263 Introduction to Biblical History and Archaeology (also NES 263, ARKEO 263, RELST 264) @ # (III)
Spring. 3 credits. J. Zorn.
For description, see NES 263.

JWST 268 Ancient Egyptian Civilization (also NES 268, ARKEO 268) @ # (III or IV)
Spring. 3 credits. G. Kadish.
For description, see NES 268.

JWST 301–302 Advanced Modern Hebrew I and II (also NES 301–302) @ (IV)
301; fall, 302, spring. 4 credits. N. Scharf.
For description, see NES 301–302.

JWST 339 Islamic Spain: Culture and Society (also RELST 334, SPANL 339, COM L 334, and NES 339) @ # (IV)
Fall. 4 credits. R. Brann.
For description, see NES 339.

JWST 360 Origins of Mesopotamian Civilization (also NES 360 and ARKEO 360) @ # (III or IV)
Fall. 4 credits. D. I. Owen.
For description, see NES 360.

JWST 361 Sumerian Language and Culture (also NES 361 and ARKEO 361) @ # (IV)
Spring. 4 credits. D. I. Owen.
For description, see NES 361.

JWST 400 Seminar in Advanced Hebrew (also NES 400) @
Fall. 4 credits. *Satisfies language proficiency.* N. Scharf.
For description, see NES 400.

JWST 420 Readings in the Hebrew Bible (also NES 420, RELST 420) (IV)
Fall. 4 credits. R. Brann.
For description, see NES 420.

JWST 458 Imagining the Holocaust (also JWST 658, ENGL 458/658, GERST 457/657) (IV)
Spring. 4 credits. D. Schwarz.
For description, see ENGL 458.

JWST 474 Topics in Modern Europe: Intellectual and Cultural History (also HIST 474 and COM L 474) (III or IV)
Fall. 4 credits. D. LaCapra.
For description, see HIST 474.

JWST 491–492 Independent Study—Undergraduate
Fall and spring. Variable to 6 credits. Staff.

JWST 499 Independent Study—Honors
Fall and spring. Variable to 4 credits. Staff.

JWST 658 Imagining the Holocaust (also JWST 458, ENGL 458/658)
Spring. 4 credits. D. Schwarz.
For description, see ENGL 458/658.

Related Courses in Other Departments

Africana Studies
Archaeology
Asian Studies
Classics
Comparative Literature
Economics
English
German Studies
Government
English
History
History of Art
Linguistics
Medieval Studies
Music
Philosophy
Religious Studies
Romance Studies
Russian Literature
Society for the Humanities
Sociology
Women's Studies

NEPALI

See Department of Asian Studies.

PALI

See Department of Asian Studies.

PHILOSOPHY

Gail Fine (Chair), R. N. Boyd, W. Bracken, M. Fara, G. Fine (on leave spring 2002), D. Graff, B. Hellie, H. Hodes (on leave spring 2002), T. Irwin (on leave 2001–2002), K. Jones, S. MacDonald, R. W. Miller, F. Neuhouser (on leave spring 2002), S. Shoemaker, H. Shue, N. Sturgeon, Z. Szabó and J. Whiting (on leave fall 2001).

Emeritus: C. A. Ginet.

The study of philosophy provides students with an opportunity to become familiar with some of the ideas and texts in the history of thought while developing analytical skills that are valuable in practical as well as academic affairs. It affords the excitement and satisfaction that come from understanding and working toward solutions of intellectual problems. The curriculum includes offerings in the history of philosophy, logic, philosophy of science, ethics, social and political philosophy, metaphysics, and theory of knowledge. Any philosophy course numbered in the 100s or 200s is suitable for beginning study in the field. Sections of Philosophy 100 are part of the freshman writing seminar program; they are taught by various members of the staff on a variety of philosophical topics, and because of their small size (seventeen students at most) they provide ample opportunity for discussion. Students who want a broad introduction to philosophy may take Philosophy 101, but many students with special interests may find that the best introduction to philosophy is a 200-level course in some particular area of philosophy; such courses have no prerequisites and are usually open to first year students.

The Major

Students expecting to major in philosophy should begin their study of it in their freshman or sophomore year. Admission to the major is granted by the director of undergraduate studies of the department on the basis of a student's work during the first two years. Normally the student must have completed two philosophy courses with grades of B or better. Eight philosophy courses are required for the major. They must include at least one course in ancient philosophy (Philosophy 210 or 211, or a course with a large component on Plato or Aristotle), at least one course in classical modern metaphysics and epistemology from Descartes through Kant (e.g., Philosophy 212 or a course on the empiricists, the rationalists, or Kant), and a minimum of three courses numbered above 300. Students admitted to the major (after fall 1996) are required to take a minimum of six philosophy courses numbered above 200, and may not count more than one section of Philosophy 100 toward the major. A course in formal logic (e.g., PHIL 231), while not required, is especially recommended for majors or prospective majors. Courses numbered 191–199 do not count toward the major.

Philosophy majors must also complete at least eight credits of course work in related subjects approved by their major advisers. Occasionally majors may serve as teaching or research aides, working with faculty members familiar with their work.

Honors. A candidate for honors in philosophy must be a philosophy major with an average of B- or better for all work in the College of Arts and Sciences and an average of B+ or better for all work in philosophy. In either or both terms of the senior year a candidate for honors enrolls in PHIL 490 and undertakes research leading to the writing of an honors essay by the end of the final term. *Honors students normally need to take PHIL 490 both terms of their senior year in order to write a satisfactory honors essay.* PHIL 490 does *not* count toward the eight philosophy courses required for the major. Prospective candidates should apply at the philosophy department office, 218 Goldwin Smith Hall.

Fees

In some courses there may be a small fee for photocopying materials to be handed out to students.

Introductory Courses

These courses have no prerequisites; all are open to freshmen.

Freshman Writing Seminars in Philosophy
Fall and spring. 3 credits. Consult the John S. Knight Institute brochure for times, instructors, and descriptions.

PHIL 101 Introduction to Philosophy (IV)
Fall. 3 credits. M W F 9:05–9:55. N. Sturgeon. Spring. T R 11:40–12:55. B. Hellie.
Fall: This course deals with a number of the central problems of philosophy, such as the existence of God, our knowledge of the external world, the mind-body problem, free will and the foundations of morality.

Spring: We talk about some big questions that make the mind boggle: why is there something rather than nothing? Is there at least one god? Is there a meaning to life, and if so what is it? Do we have free will? Students should not expect to be given conclusive answers to these questions. They should, however, expect to deal with abstractions on a regular basis, and to get used to chopping things up and organizing them in a precise way; otherwise things get out of control pretty quickly.

[PHIL 131 Logic, Evidence and Argument
Fall. 3 credits. Not offered 2001–2002.]

PHIL 142 Appropriation and Alienation (IV)
Spring. 3 credits. Intended for freshmen and sophomores. M W F 9:05–9:55. T. J. Berry.
This course investigates an important issue in political philosophy: the justification of property rights. We start the course by

watching a film, *The Field*, in which two different conceptions of what justifies ownership come into conflict. Should things belong to those who make them? Or shouldn't labor be the primary justification of property rights? We spend the first half of the course investigating how the philosopher John Locke handles this issue in his classic defense of private property. In the second half, we consider Karl Marx's classic objections to Locke's defense of private property.

[PHIL 145 Contemporary Moral Issues (IV)
Not offered 2001–2002.]

PHIL 181 Introduction to the Philosophy of Science (IV)
Spring. 3 credits. T R 1:25–2:40. N. Sethi.
This course is an introductory survey of contemporary philosophy of science. We attempt to answer such central questions as: What reasons do scientists have for accepting current scientific theories? How can scientists test theories about unobservable entities? Is science a search for truth? Do scientists discover or construct facts about nature? Are scientific claims immune to cultural, social, and subjective influences? The last part of the course focuses on the moral issues that scientific and technological developments force us to face.

PHIL 191 Introduction to Cognitive Science (also COGST 101 and PSYCH 102) (III)
Fall. T R 11:40–12:55. M. Spivey.
This course surveys the study of how the mind/brain works. We examine how intelligent information processing can arise from biological and artificial systems. The course draws primarily from five disciplines that make major contributions to cognitive science: philosophy, psychology, neuroscience, linguistics, and computer science. The first part of the course introduces the roles played by these disciplines in cognitive science. The second part of the course focuses on how each of these disciplines contributes to the study of five topics in cognitive science: language, vision, learning and memory, action, and artificial intelligence. Does not count toward the Philosophy major or toward the Humanities Distribution Requirement in Philosophy.

PHIL 193 Inequality, Diversity, and Justice (also CRP 293, GOVT 293, SOC 293) (III or IV)
Fall. 4 credits. No prerequisites. Intended primarily for freshmen and sophomores. M W F 2:30–3:20. The class will meet as a whole, for a lecture, F, 8/31; thereafter, lectures will be given M W, disc secs will be F. R. Miller.
An interdisciplinary discussion of the nature and moral significance of social inequality, diversity and poverty and of the search for just responses to them. How unequal are economic opportunities in the United States today? How many people are in genuine poverty? What are the typical causes of poverty? To what extent, if any, does justice require government action to reduce current economic inequalities? Does race have special significance as a source of inequality? Does gender? Is affirmative action justified, as a response to such inequalities? How does membership in an ethnic group shape people's lives, and how should it? How should governments deal with religious diversity and other differences in ultimate values (which give rise, for example, to radically different attitudes toward abortion, school prayer, and sexuality)? Do people in per-capita rich countries have a duty to help the foreign poor? Moral argument, investigations of social causes, and legal reasoning interact in the search for answers to these questions. To provide these resources, the course is taught by leading faculty researchers in philosophy, political theory, the social sciences, and law.

PHIL 194 Global Thinking (also GOVT 294) @ (III or IV)
Fall. 4 credits. No prerequisites. Intended for freshmen and sophomores, plus required disc. T R 1:25–2:40. H. Shue.
The analysis taught is global in two independent respects: international subjects and interdisciplinary methods. We examine in depth questions raised by one of the most important and most difficult issues facing international society: when, if ever, should other nations unilaterally or multilaterally intervene militarily into ethnic conflicts like those in Rwanda 1994, from which UN forces were withdrawn just before 800,000 were massacred, and Kosovo 1999, into which NATO intervened but only with airpower and without Security Council authorization). These recent cases raise fundamental questions about global governance in the 21st century. To what extent is the system of sovereign nation-states inherited from 17th century Europe still either desirable or unavoidable? Does every ethnic group have a right to self-determination? When, if ever, is the use of military force for purposes other than self-defense justified? To stop genocide? Should trials for war crimes routinely be held after military conflicts by the proposed International Criminal Court? Such moral issues are explored in the light of the political dynamics of foreign intervention and the evolving international legal regime, setting ethics in the context of politics and law.

[PHIL 210 Ancient Thought # (IV)
4 credits. Not offered 2001–2002.]

PHIL 211 Ancient Philosophy (also CLASS 231) # (IV)
Fall. 4 credits. No prerequisites. T R 11:40–12:55. C. Brittain.
This course explores the origin and development of Western philosophy in Ancient Greece and Rome. We explore some of the central ideas of the Pre-Socratics, Socrates, Plato, Aristotle, and the Hellenistic philosophers (Epicureans, Stoics, and Skeptics). Questions considered include: What are the nature and limits of knowledge? How reliable is perception? What are the basic entities in the universe: atoms, Platonic Forms, or Aristotelian substances? Is moral knowledge possible? What is the nature of happiness and what sort of life will make people happy? Do human beings have free will?

PHIL 212 Modern Philosophy # (IV)
Spring. 4 credits. M W F 1:25–2:15. S. Shoemaker.
A survey of major philosophical problems in metaphysics and the theory of knowledge in seventeenth and eighteenth century European philosophy. Readings from Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant.

PHIL 213 Existentialism (IV)
Fall. 4 credits. M W F 12:20–1:10. B. Bracken.
This course provides an introduction to the major themes of existentialism in philosophy and literature, as exemplified in central texts from Kierkegaard, Nietzsche, Camus, Sartre, and Beauvoir. Topics discussed include: the relationship between freedom and responsibility; the idea that a self is something one "becomes"; the role of evaluation and commitment in becoming a self; the Sartrian doctrine that evaluations and commitments are ultimately based on "absurd" or "groundless" individual choices; the possibility of an ethics of authenticity and the relationship of the latter to what we normally think of as ethics; bad faith and self-deception; the role that relations to others play in the achievement of selfhood; and the relationship between the form and content in existentialist writings.

[PHIL 214 Philosophical Issues in Christian Thought # (IV)
4 credits. Not offered 2001–2002.]

[PHIL 219 Marx # (IV)
Not offered 2001–2002.]

PHIL 231 Introduction to Deductive Logic (II)
Fall and spring. 4 credits. No prerequisites. M W F 11:15–12:05. Fall, D. Graff; spring, Z. Szabó.
The course covers the basics of propositional and first-order logic with a special emphasis on the problem of translating English sentences into the formal language of these logics. We use a textbook accompanied by a software package (Barwise and Etchemendy, *Logic, Proof and Language*), which makes it easier to learn the skills necessary for doing formal proofs.

PHIL 241 Ethics (by petition for breadth requirement) (IV)
Spring. 4 credits. M W F 10:10–11:00. N. Sturgeon.
An introduction to the philosophical evaluation of moral theories and moral arguments. Topics include: ethical relativism, ethical egoism, ethical skepticism, utilitarianism and duty-based theories; some application to controversial contemporary issues.

[PHIL 242 Social and Political Philosophy (also GOVT 260) (III or IV)
Not offered 2001–2002.]

[PHIL 243 Aesthetics (IV)
4 credits. Not offered 2001–2002.]

[PHIL 244 Philosophy and Literature (IV)
4 credits. Not offered 2001–2002.]

PHIL 245 Ethics and Health Care (IV)
Fall. 4 credits. M W F 10:10–11:00. T. J. Berry.
This course is an introduction to the ethical issues associated with contemporary medicine. No previous study of philosophy is presupposed. The course has two lectures and one discussion section per week. Topics to be covered include: the professional-patient relationship (including informed consent, medical confidentiality, medical paternalism, and trust); contemporary problems such as abortion and euthanasia—beginning from these practical moral problems we investigate concepts such as illness, death, autonomy, quality of life and personhood; and health care in a just society. We consider competing conceptions of justice and arguments for entitlement to health care. Does justice require that all have access to basic health care? Does it require that all have access to approximately the same level of health care? What are the implications for access to health care

resources by the requirement that we not discriminate on the basis of race or gender? In the course of investigating these topics, there questions emerge about what ethics is, and whether or not ethical judgments can be objective. Thus, in addition to learning how to arrive at and defend ethical positions, we reflect on the techniques and methods we use.

PHIL 246 Ethics and the Environment (also S&TS 206) (IV)
Spring. 4 credits. Open to all undergraduates; permission of instructor required for freshmen. T R 10:10–11:25. N. Sethi.
The aim of this course is to acquaint students with moral issues that arise in the context of the environment and environmental policy. Our concerns about the environment bring to our attention the importance of economic, epistemological, legal, political, and social issues in assessing our moral obligations to other humans and the natural world. Our attempt then is to explore how different factors come into play in defining our responsibilities to the environment and to examine the grounds for our environmental policy decisions.

PHIL 247 Ethics and Public Life (IV)
4 credits. Fall. T R 10:10–11:25. M. Moody-Adams.
What kind of public life is worth having? This course examines the efforts of philosophers, social theorists, theologians, and others to understand the ethical dimensions of our lives as citizens of complex social and political communities. We consider several questions of pressing concern. To what moral standards should we hold those, such as politicians and journalists, whose professions involve service to the public? What moral obligations do citizens themselves have to those with whom they share a public life? What does morality tell us about how to draw the line between "public" and "private," for the purposes of public policy? Is it ever morally permissible (or even required) to opt out of demands that underwrite a stable public life—in civil disobedience, for instance, or in conscientious objection to some public policy?

PHIL 249 Feminism and Philosophy (also WOMNS 249) (IV)
Spring. 4 credits. M W 2:55–4:10.
J. Whiting.
An introduction using a variety of texts (philosophical, historical, literary, legal, and political) to feminist thought. Special attention is paid to sexual difference and the social construction of gender, and to how we frame various issues (e.g., whether pornography is primarily an issue about freedom of expression or about equal protection).

PHIL 261 Knowledge and Reality (IV)
Fall. 4 credits. T R 1:25–2:40. M. Fara.
This course provides an introduction to some central philosophical questions about the nature of the universe and our knowledge of it. Questions addressed include: What is the relation between mind and matter? What reason do we have to believe in the predictions of science? How do you know you're not dreaming right now? What is the nature of human freedom? Don't expect the course to answer these questions once and for all. Instead, expect to learn how to go about thinking about them, and how to distinguish a good philosophical argument from a bad one.

PHIL 262 Philosophy of Mind (IV)
Fall. 4 credits. M W 2:55–4:10. B. Hellie.
There are a couple of central problems in philosophy of mind: What is consciousness? How does something in the skull get to be "about" something not in the skull? We try to make some headway on these issues. We also talk about such questions as whether we think in language, in pictures, in both, or in neither; whether we have any innate mental abilities and if so how many; and the nature of the self.

PHIL 263 Religion and Reason (IV)
Spring. 4 credits. M W F 11:15–12:05.
S. MacDonald.
What must (or could) God be like, and what reasons do we have for thinking that a being of that sort actually exists? What difference would (or could) the existence of God make to our lives? This course examines the idea, common to several major world religions, that God must be an absolutely perfect being. What attributes must a perfect being have? Must it have a mind, be a person, care for human beings? Is the concept of a perfect being coherent? Is the existence of a perfect being compatible with the presence of evil in the world and the existence of human freedom? Does human morality depend in any important way on the nature or will of a perfect being? Is a perfect being among the things that actually inhabit our universe? The course approaches these questions with the tools and methods of philosophical reason and through readings drawn from both classic texts and contemporary philosophical discussion.

[PHIL 270 Truth and Interpretation (also LING 270/COGST 270) (III or IV)
4 credits. Not offered 2001–2002.]

PHIL 286 Science and Human Nature (also S&TS 286) (IV)
Spring. 4 credits. T R 10:10–11:25. R. Boyd.
Topic for 2001–2002: Darwin, Social Darwinism, and Human Sociobiology. An examination of attempts in the biological and social sciences to offer scientific theories of human nature and human potential and to apply such theories to explain important social and psychological phenomena.

Intermediate or Advanced Courses

Some of these courses have prerequisites.

PHIL 309 Plato (also CLASS 339) # (IV)
Fall. 4 credits. Prerequisites: at least one previous course in philosophy at the 200 level or above; or the permission of the instructor. T R 2:55–4:10. G. Fine.
We consider many of Plato's major dialogues, focusing on questions in metaphysics and epistemology, though some attention is also paid to his ethical and political theories, especially in the Republic. Among the topics considered are the following: the theory of Forms; Socrates' disavowal of knowledge; dialectic and recollection; the nature of knowledge and how to acquire it; the nature of the soul and moral motivation; justice and happiness.

PHIL 310 Aristotle # (IV)
Spring. 4 credits. T R 11:40–12:55.
B. Morison.
This course is an introduction to several major aspects of Aristotle's Logic, Metaphysics, Physics, Biology, and Ethics. Topics covered include: argument and reason, science and knowledge, cause and effect, time and space, body and soul, good and bad, life and death, though not necessarily in that order.

[PHIL 311 The Rationalists # (IV)
Not offered 2001–2002.]

[PHIL 312 Modern Empiricism # (IV)
Not offered 2001–2002.]

[PHIL 313 Twentieth-Century Continental Philosophy (IV)
Spring. 4 credits. Not offered 2001–2002.]

[PHIL 314 Ancient Philosophy: The World of Theory and the World of Ordinary Life # (IV)
4 credits. Not offered 2001–2002.]

PHIL 315 Medieval Philosophy # (IV)
Spring. 4 credits. M W F 1:25–2:15.
S. MacDonald.
A survey of some main themes and major figures in medieval philosophy. Emphasis is on the close reading and analysis of representative texts, but some attention is given to the general historical development of philosophical themes and traditions during the thousand years separating late antiquity and the Renaissance. Readings (in English translation) may include Augustine, Boethius, Anselm, Abelard, Aquinas, Scotus, and Ockham and address topics in metaphysics, epistemology, ethics, and philosophical theology.

PHIL 316 Kant # (IV)
Fall. 4 credits. T R 10:10–11:25.
F. Neuhouser.
An introduction to Kant's main metaphysical and epistemological doctrines as presented in the *Critique of Pure Reason*, including: the nature of space and time, the justification of scientific knowledge, the nature of human reason and self-consciousness. Special attention is paid to Kant's critique of traditional metaphysics and his attempt to establish a new metaphysics, grounded in practical reason, that establishes the existence of God, human freedom, and morality.

[PHIL 317 Hegel # (IV)
4 credits. Not offered 2001–2002.]

[PHIL 318 Origins of Twentieth-Century Philosophy (IV)
Not offered 2001–2002.]

PHIL 319 Post-War Analytic Philosophy (IV)
Spring. 4 credits. T R 2:55–4:10. B. Hellie.
Three central research topics in postwar analytic theory have concerned the nature of modality, the nature of meaning, and the links between modality and meaning. We start with Carnap's attempt to reduce the former to the latter. Then we move onto Quine's technical critique of this program. The two leading post-Quinean approaches to modality are that of Saul Kripke, which attempts to rehabilitate the metaphysical perspective on modality Carnap was trying to avoid; and that of David Lewis, which attempts to rehabilitate the Carnapian program against Quine's criticism. Quine also famously criticized the notion of meaning. Davidson attempted to save theorizing about meaning from this criticism by theorizing about meaning without appeal to meanings. We examine neo-Davidsonian approaches to meaning and challenges to them from the Kaplanites and the conceptual role theorists. If time permits we also address the degree to which language is conventional.

PHIL 320 17th Century Women Philosophers (also WOMNS 319) # (IV)
Spring. 4 credits. M 7:30–9:25. L. Shapiro.
We look at the writings of such women thinkers as Lucrezia Marinella, Marie de Gournay, Anna Maria van Schurman, Elizabeth of Bohemia, Margaret Cavendish, Anne Conway, Mary Astell, and Damaris Masham, attending to their philosophical positions—on causation, free will, virtue, the nature of substance, and the nature of women—and consider the ways in which they are in conversation with other more familiar philosophers of the 17c (including Montaigne (16c), Descartes, Leibniz and Locke (18c). Historiographical issues of how some philosophers and philosophical questions become canonical and others disappear from view lurk in the background.

PHIL 331 Deductive Logic (also MATH 281) (II)
Fall. 4 credits. Prerequisite: PHIL 231 or equivalent or permission of instructor.
M W F 2:30–3:20. H. Hodes.
Course topics include: review of derivations and truth-in-a-model; function-constants and identity; truth in non-fully-distinguished models; very basic set-theory; sets as the only mathematical objects; mathematical induction; soundness; and completeness.

PHIL 332 Philosophy of Language (IV)
Fall. 4 credits. T R 11:40–12:55. Z. Szabó.
This course is an introduction to contemporary philosophy of language. About two thirds of the course is spent reading and discussing some of the classic work done between 1879 and 1905, and between 1967 and 1977, by philosophers such as Frege, Russell, Grice, Davidson, Kripke, and Kaplan. These papers are essential reference points in contemporary debates not only in philosophy of language but in analytic philosophy in general. The rest of the course focuses on a specific topic: the interpretation of modal expressions, such as *necessarily*, *possibly*, *ought*, *can*, etc.

[PHIL 333 Problems in Semantics (also LING 333 and COGST 333) (III or IV)
Not offered 2001–2002.]

PHIL 334 Pragmatics (also LING 325) (III or IV)
Fall. 4 credits. Prerequisite: LING 201 or PHIL 231 or permission of instructor.
T 2:30–5:00. D. Abusch.
An introduction to aspects of linguistic meaning which have to do with context and with the use of language. Topics include context change semantics and pragmatics, presupposition and accommodation, conversational implicature, speech acts, and the pragmatics of definite descriptions and quantifiers.

[PHIL 341 Ethical Theory (IV)
Not offered 2001–2002.]

[PHIL 343 Resistance and Responsibility (also LAW 676) (IV)
4 credits. Not offered 2001–2002.]

[PHIL 344 History of Ethics: Ancient and Medieval # (IV)
4 credits. Not offered 2001–2002.]

[PHIL 345 History of Ethics: Modern # (IV)
4 credits. Not offered 2001–2002.]

PHIL 346 Modern Political Philosophy (also GOVT 462) (III or IV)
Fall. 4 credits. T R 2:55–4:10. R. Miller.
A study of the leading contemporary theories of justice, including the work of Rawls, Nozick, Gauthier, and Scanlon. We discuss rival views of the moral significance of economic inequality, the kinds of freedom that governments ought to protect, the kinds of values and convictions that are a proper basis for laws (as opposed to being private matters), the tension between unequal political influence and democratic rights, and the roles of community, virtue, and group-loyalty in political justification. We are largely concerned with the conceptions of freedom, equality, obligation, and community underlying competing theories. We also consider implications for specific political controversies, e.g., over abortion, welfare programs, and pornography.

PHIL 361 Epistemology (IV)
Fall. 4 credits. T R 1:25–2:40. D. Graff.
This course is a survey of some contemporary philosophical issues and debates in the study of knowledge. Our investigations include: (i) the possibility of knowledge, whether there is merit to the skeptical idea that we don't know much about anything, since for all we know, we're brains in vats, with all our experiences being wired in directly by benevolent scientists; (ii) the analysis of knowledge, whether knowledge is true justified belief or something else (and what is it anyway for a belief to be justified?); and (iii) the various means by which we acquire knowledge (if we do), such as through reason, perception, and the testimony of others.

[PHIL 362 Philosophy of Mind (IV)
Not offered 2001–2002.]

[PHIL 363 Topics in the Philosophy of Religion (IV)
4 credits. Not offered 2001–2002.]

PHIL 364 Metaphysics (IV)
Spring. 4 credits. T R 1:25–2:40. M. Fara.
This course focuses on problems surrounding the idea that we have "free will", that we are free to act in whatever way we choose. Are we free in this way? If we are, how does that fit with the idea that we inhabit a causally ordered universe? If we have free will, what (if anything) might that tell us about the relation between the past and the future? And what is the connection between having free will and being morally responsible for our actions? In exploring these and related questions, we look at a wide variety of work in metaphysics and philosophy of mind.

[PHIL 368 Global Climate and Global Justice (also GOVT 368) (III or IV)
4 credits. Not offered 2001–2002.]

[PHIL 369 Limiting War (also GOVT 469) (III or IV)
4 credits. Not offered 2001–2002.]

PHIL 381 Philosophy of Science: Knowledge and Objectivity (also S&TS 381) (IV)
Fall. 4 credits. W 7:30–10:00. R. Boyd.
An examination of central epistemological and metaphysical issues raised by scientific theorizing: the nature of evidence; scientific objectivity; the nature of theories, models, and paradigms; and the character of scientific revolutions.

[PHIL 382 Philosophy and Psychology (IV)
4 credits. Not offered 2001–2002.]

[PHIL 383 Choice, Chance, and Reason (IV)
4 credits. Not offered 2001–2002.]

[PHIL 384 Philosophy of Physics (IV)
4 credits. Not offered 2001–2002.]

[PHIL 387 Philosophy of Mathematics (IV)
4 credits. Not offered 2001–2002.]

[PHIL 389 Philosophy of Science: Evidence and Explanation (IV)
4 credits. Not offered 2001–2002.]

PHIL 390 Informal Study
Fall or spring. Credit TBA.
To be taken only in exceptional circumstances. Must be arranged by the student with his or her adviser and the faculty member who has agreed to direct the study.

Advanced Courses and Seminars

These courses are offered primarily for majors and graduate students.

[PHIL 395 Majors Seminar
4 credits. Not offered 2001–2002.]

[PHIL 409 German Philosophical Texts (IV)
Not offered 2001–2002.]

PHIL 410 Latin Philosophical Texts # (IV)
Fall and spring. Variable credit. Prerequisites: knowledge of Latin and permission of instructor. Hours TBA. S. MacDonald.
Reading of philosophical texts in the original Latin.

PHIL 411 Greek Philosophical Texts (also CLASS 311) # (IV)
Fall and spring. Variable credit. Prerequisites: knowledge of Greek and permission of instructor. Hours TBA. Staff.
Reading of philosophical texts in the original Greek.

[PHIL 412 Medieval Philosophy # (IV)
Not offered 2001–2002.]

[PHIL 413 Topics in Ancient Philosophy (also S HUM 402 and 403) # (IV)
Not offered 2001–2002.]

[PHIL 414 German Philosophy after Kant (IV)
Not offered 2001–2002.]

[PHIL 415 Special Topics in the History of Philosophy (IV)
Not offered 2001–2002.]

PHIL 416 Modern Philosophy # (IV)
Fall. 4 credits. M 12:20–2:15. L. Shapiro.
We consider the theories of the passions or emotions of several philosophers of the Early Modern period, including Descartes, Spinoza, and Hume. Of particular concern are accounts of the representationality of the passions, the way these accounts put pressure on or resolve tensions in theories of mind and human nature, and the place of the passions in accounts of moral psychology.

[PHIL 431 Mathematical Logic (also MATH 481) (II)
Not offered 2001–2002.]

[PHIL 432 Topics in Logic (also MATH 482) (II)
Not offered 2001–2002.]

[PHIL 433 Philosophy of Logic
4 credits. Not offered 2001–2002.]

PHIL 434 The Foundations of Mathematics (also MATH 384) (II)
Fall. 4 credits. M W F 1:25–2:15. H. Hodes. Set-theory is the standard theoretical basis for mathematics (though there are competitors). Primarily this is a course on set-theory, based on H. Enderton's text *Elements of Set Theory*. After some presentation of the foundational "crisis" in Mathematics of the late 19th century, and related developments in philosophy, we'll cover the usual the ZF axioms, the axiom of Choice, Ordinal and Cardinal arithmetics, construction of standard models of the usual number systems. Time permitting we may cover: large cardinals; determinacy; type-theory; or the untyped lambda calculus as a foundation.

PHIL 436 Intensional Logic (II)
Spring. 4 credits. T R 10:10–11:25. D. Graff. In this course we investigate various logics of necessity and possibility. We study formal proof procedures as well as possible worlds semantics. We also prove various "meta" results, including completeness theorems. The techniques learned in this part of the course are then applied to the study of conditionals and tense operators. Further topics may include counterpart theory, the logic of epistemological operators, and the method of supervaluations as it applies to the semantics of vague predicates and also positive and comparative adjectives.

[PHIL 437 Topics in the Philosophy of Language (IV)
4 credits. Not offered 2001–2002.]

PHIL 441 Contemporary Ethical Theory (IV)
Fall. 4 credits. M W F 11:15–12:05. N. Sturgeon.
Topic for fall: Moral Realism and its Critics.

[PHIL 442 Ethics and the Philosophy of Mind (IV)
4 credits. Not offered 2001–2002.]

[PHIL 443 Aesthetic Theory (IV)
4 credits. Not offered 2001–2002.]

[PHIL 444 Contemporary Legal Theory (also LAW 710) (IV)
4 credits. Not offered 2001–2002.]

[PHIL 446 Topics in Social and Political Philosophy (also GOVT 474) (III or IV)
Not offered 2001–2002.]

PHIL 447 Contemporary Political Philosophy (also GOVT 465) (III or IV)
Spring. 4 credits. M W 2:55–4:10. R. Miller. Topic for 2002: Reconceiving Liberalism. While traditional liberal political goals of civil liberty, political equality, and fair economic opportunity retain a central place in current political philosophy, there are sharply contrasting views of the basis, nature, and implications of these aspirations. Should the individualism of traditional liberalism be rejected in favor of a fundamental commitment to community, grounding goals of equality? Should the goal of neutrality among ways of life be replaced by a political commitment to facilitate liberal virtues of autonomy? Should basic political choices be derived from a purely political conception of mutually respectful citizenship? From a general conception of what people owe to each other? For what reasons and to what extent should inequalities of wealth and income be opposed? Is it consistent for liberal egalitarians not to give away much of their income to the poor, if they are well-off, or not to support world-wide equality? Our discussions of such questions will include Raz, *The Morality of Freedom*; Sandel, *Democracy's Discontent*, work by Rawls, Scanlon, Dworkin, Gerald Cohen, and Elizabeth Anderson; and relevant judicial disputes over the nature of the liberty and equality protected by the U.S. Constitution.

PHIL 460 Epistemology (IV)
Fall. 4 credits. M 7:30–10:00. B. Hellie. We talk about Tim Williamson's recent book *Knowledge and its Limits*, which is interesting in that it focuses on applying the concept of knowledge rather than eliminating it. We also do related texts and other issues in epistemology, such as contextualism.

[PHIL 461 Feminist Epistemology (also WOMNS 461) (IV)
4 credits. Not offered 2001–2002.]

[PHIL 462 Philosophy of Mind (IV)
4 credits. Not offered 2001–2002.]

[PHIL 481 Problems in the Philosophy of Science (IV)
Not offered 2001–2002.]

[PHIL 484 Philosophy of Physics (IV)
Not offered 2001–2002.]

PHIL 490 Special Studies in Philosophy (IV)
Fall and spring. 4 credits. Open only to honors students in their senior year. See Honors description at the beginning of Philosophy section.

PHIL 611 Ancient Philosophy (also CLASS 671)
Fall. 4 credits. R 4:30–6:30. D. Sedley.
Spring. W 4:30–6:30. B. Morison.
Fall: Topic: The Pre-Socratics—the philosophical positions and arguments of the major fifth-century BC Pre-Socratic thinkers, from Heraclitus to Democritus.

Spring: Topic: A systematic study of a short introduction to logic and scientific reasoning written in the second century CE by Galen, the second greatest medical doctor in antiquity (after Hippocrates) and a philosopher in his own right. The work is of interest not only for its exposition of Aristotelian and Stoic Logic, but also for a mysterious third type of reasoning which Galen introduces, namely 'relational' reasoning.

[PHIL 612 Medieval Philosophy
Not offered 2001–2002.]

[PHIL 613 Modern Philosophers
4 credits. Not offered 2001–2002.]

[PHIL 619 History of Philosophy
4 credits. Not offered 2001–2002.]

PHIL 633 Philosophy of Language
Spring. 4 credits. R 4:30–6:30. D. Graff. The topic of the seminar is vagueness and the sorites paradox. The vagueness of a predicate like 'tall woman' is metaphorically characterized by saying that there is a "fuzzy boundary" between the women it applies to and those it doesn't. The sorites paradox of antiquity (also known as "the paradox of the heap") arises from thoughts such as, "If I'm tall before I go to bed then even if I shrink 1mm overnight, I'll still be tall when I wake up," which, though attractive, apparently lead to absurdity. We will question what the fuzziness that's characteristic of vagueness amounts to; what is the relation between vagueness and perception; how are we to resolve the sorites paradox; does vagueness require us to abandon Bivalence and the Law of Excluded Middle; can the epistemological and metaphysical problems arising from vagueness be adequately handled by some such revision to classical logic or semantics.

[PHIL 641 Ethics and Value Theory
Not offered 2001–2002.]

PHIL 642 Morality, Self, and Psychopathology
Spring. 4 credits. T 4:30–6:30. J. Whiting. Philosophical accounts of personal identity typically aspire to a kind of universality; each account tends to represent itself as *the* (presumably uniquely) correct account implying the falsity of its various rivals (e.g., psychological continuity theories implying the falsity of bodily continuity theories and vice versa). But to the extent that we are dealing with *selves*—i.e., partially reflexive entities—it seems possible that different self-*conceptions* might yield different sorts of *selves*, some more and some less bodily (or psychological) than others. We will examine this sort of "contingency of selfhood" both cross-culturally (looking at non-Western conceptions of self and at the Buddhist ideal of self-dissolution) and psychopathologically (looking at pathological configurations of self such as those involved in autism, schizophrenia, multiple-personality-disorder, and eating disorders), treating the study of psychopathology as akin to ethnography. The idea is to see whether forms of selfhood that we take for granted and perhaps even view as inescapable are in fact contingent and optional. We can then ask what sorts of selfhood it is *valuable* to cultivate. This raises the difficult question of the point(s) of view from which we are to make such assessments.

[PHIL 661 Theory of Knowledge
4 credits. Not offered 2001–2002.]

PHIL 662 Philosophy of Mind
Fall. 4 credits. W 4:30–6:30. Z. Szabó. The course focuses on the nature of concepts. What concepts are and what role they play in psychological explanations is once again intensely debated in the philosophy of mind. We start with Frege and with opinions in the secondary literature regarding the proper understanding of his notion of sense. For Frege, the sense of an expression played a triple role: it is that which a competent speaker of a language grasps in understanding a linguistic expression, it determines the referent of that expression, and it serves as its referent in opaque contexts. It is more or less uncontroversial today that nothing could play all three of these roles. The question is, which of the three aspects of a Fregean theory we should preserve in a theory of concepts, and how we should allocate the other explanatory tasks in an overall view of cognition. In this course we focus on attempts to come up with a systematic view due to Burge, Fodor, and Peacocke. We inevitably touch related issues, such as the semantics of empty names, propositional attitudes, intensional transitive verbs, the status of conceptual truth, and the transparency of content.

[PHIL 663 Philosophy of Religion
4 credits. Not offered 2001–2002.]

PHIL 664 Metaphysics
Fall. 4 credits. T 4:30–6:30. S. Shoemaker. Topic: Color and color experience.

PHIL 665 Metaphysics
Spring. 4 credits. M 4:30–6:30. M. Fara. It is frequently taken for granted in many areas of philosophy that we understand the notion of a disposition. In this seminar, by looking at some issues in the metaphysics of dispositions, we see just how problematic that notion is. Among the questions we consider are: What, in general, does it take for something to have a disposition? How do we distinguish dispositions from other kinds of properties? What is the relation between dispositions and their "categorical bases"? Are dispositions "reducible," and what does this mean? Do dispositions cause their manifestations? Are dispositions intrinsic properties of their bearers? In addressing these questions, we touch on a wide range of topics in metaphysics, including causation, causal explanation, laws of nature, and the intrinsic/extrinsic distinction.

PHIL 681 Philosophy of Science
Spring. 4 credits. W 7:30–10:00. R. Boyd. Topic: Topics in the philosophy of science.

[PHIL 682 Philosophy of Social Science
4 credits. Not offered 2001–2002.]

PHIL 700 Informal Study
Fall or spring. Credit TBA.
To be taken by graduate students only in exceptional circumstances and by arrangement made by the student with his or her Special Committee and the faculty member who has agreed to direct the study.

[PHIL 773 Proseminar in Cognitive Studies (also COGST 773, LING 773, and COM S 773)
Fall. 2 credits. R grade. Not offered 2001–2002.
For description, see COGST 773.]

[PHIL 774 Proseminar in Cognitive Studies (also LING 774 and COGST 774)
Not offered 2001–2002.
For description, see COGST 774.]

PHYSICS

G. P. Lepage, chair (109 Clark Hall, 255–6016); J. T. Rogers, director of undergraduate studies (101 Clark Hall, 255–8158); J. P. Alexander, V. Ambegaokar, P. C. Argyres, T. A. Arias, N. W. Ashcroft, K. Berkelman, E. Bodenschatz, P. Brouwer, D. G. Cassel, P. Drell, G. F. Dugan, V. Elser, D. B. Fitchen, E. E. Flanagan, C. P. Franck, R. S. Galik, L. K. Gibbons, B. Gittelman, B. Greene, S. M. Gruner, L. N. Hand, D. L. Hartill, C. L. Henley, W. Ho, A. LeClair, D. M. Lee, P. L. McEuen, N. D. Mermin, N. Mistry, M. Neubert, H. Padamsee, J. M. Parpia, J. R. Patterson, R. O. Pohl, D. C. Ralph, J. D. Reppy, R. C. Richardson, D. L. Rubin, J. P. Sethna, A. J. Sievers, E. Siggia, P. C. Stein, R. M. Talman, S. A. Teukolsky, R. Thorne, H. Tye, M. D. Wang, T-M. Yan

The Department of Physics offers a full range of university-level work in physics, from general education courses for nonscientists to doctoral-level independent research. Major research facilities are operated by two component organizations, the Laboratory of Atomic and Solid State Physics (LASSP) and the Laboratory of Nuclear Studies (LNS). LASSP carries out extensive research efforts in condensed-matter physics and in low-temperature physics. LNS operates a major high-energy particle physics research facility at Wilson Laboratory, the Cornell electron-positron storage ring (CESR). Theoretical work is carried out in many fields of physics, including astrophysics. There is a full schedule of weekly research-oriented seminars and colloquia. Students will find many opportunities for research participation and summer employment.

Introductory physics sequences are: 101–102, 207–208, and 112–213–214, or its honors version 116–217–218. In addition, there is a group of general-education courses, PHYS 200–206, 209, 210. PHYS 101–102, a self-paced autotutorial course, is designed for students who do not intend to take further physics courses and who do not have preparation in calculus. PHYS 112 and 207 both require calculus (MATH 190 or 191 or 111), and additional mathematics is required for subsequent courses in the sequence. PHYS 101–102 or 207–208 may be taken as terminal physics sequences. The three-term sequence 112–213–214 or its honors version, 116–217–218, is recommended for engineers and physics majors. PHYS 214 and 218 are placing an increasing emphasis on use of the computer for homework, laboratory exercises, and projects; some knowledge about computing, perhaps at the level of COM S 99 or 100, is desirable.

Courses beyond the introductory level that might be of interest to nonmajors include. PHYS 316 (Modern Physics I); PHYS 330 (Modern Experimental Optics); and PHYS 360 (Electronic Circuits).

Advanced placement and credit are offered as outlined in "Advanced Placement of Freshmen." or students may consult the director of undergraduate studies, as should students requesting transfer credit for physics courses taken at another college.

The Major

The major program is constructed to accommodate students who wish to prepare for professional or graduate work in physics as well as those who wish to complete their major program in the field of physics but have other post-graduation goals.

Students who wish to major in physics are advised to start the physics sequence in the first term of their freshman year. (Note that students who have had contact with introductory calculus may take PHYS 112 with co-registration in MATH 190 or 191.) The major program can still be completed with a second-term start, but flexibility in future course scheduling is reduced.

Prospective majors are urged to make an early appointment at the physics office for advice in program planning. Acceptance into the major program is normally granted upon completion of a year of physics and mathematics courses at Cornell with all course grades at the B-level or higher. The department office will give advice in the matter of selecting a major faculty adviser. Details of the major course program are worked out in consultation between the student and major adviser.

Physics Core

Common to all major programs is a requirement to complete a core of physics courses. In addition to the three-term introductory sequence (PHYS 112–213–214 or PHYS 116–217–218), the core includes five upper-level courses—(a) the two-course sequence in modern physics (PHYS 316–317), (b) at least three semester hours of laboratory work selected from PHYS 310, 330, 360, 410, Astronomy 410, (c) an intermediate course in classical mechanics, and (d) an intermediate course in electromagnetism.

Typical Physics Course Sequences (other sequences are also possible)

Semester	No AP math or physics	1 year AP calculus and good HS physics	Outside concentrators	Outside concentrators (alternate)
1st – Fall	112	116	112	
2nd – Spring	213	217	213	112
3rd – Fall	214	218	214	213
4th – Spring	316, 3x0	316, 3x0	3x0	214
5th – Fall	317, 327, 3x0	317, 327, 3x0	316	3x0, 316
6th – Spring	314/318, 443	318, 443	314	314, 3x0
7th – Fall	341, 410	341, 410	317, 323	317, 323
8th – Spring	Elective(s)	Elective(s)		

- For majors with concentrations outside physics, there will be wide variation in individual programs, arranged to best match the field of concentration.
- Crossovers between the two sequences 112–113–214 and 116–217–218 are possible, although the combinations 112–217–218 and 112–213–218 are difficult. PHYS 207 may be substituted for PHYS 112. Students taking 217 after 112 must coregister for 216.
- Students taking the honors sequence 116–217–218 are strongly encouraged to start with PHYS 116. Exceptionally well-prepared students may be able to begin work at Cornell with PHYS 217. Such students should come to the department office for advice in planning a course program.
- Physics electives for the major include 360, 444, 454, 455, 480, 490, 525, 553, 561, 572, the senior seminars 481–489, ASTRO 332 or 431–432, and A&EP 434.
- **One** semester of intermediate laboratory, listed here as 3x0, is required.
- Well-prepared sophomores wishing to take PHYS 318 should consult the instructor before registering.

Accompanying these physics courses should be work in mathematics through at least MATH 222 or 294. Students following the professional/graduate school channel are expected to complete at least one additional year of applicable mathematics (A&EP 321–322 or MATH 321/420–422).

In *addition* to the core, each physics major must complete 15 semester hours of credit in an area of concentration which has been agreed on by the student and major faculty adviser.

Concentration within Physics

A student who wishes to pursue professional or graduate work in physics or a closely related field should follow a concentration within the field of physics. For those students with a strong secondary school preparation, the sequence PHYS 116–217–218 is encouraged. Students are strongly encouraged to start the sequence with PHYS 116, even if they qualify for advanced placement credit for PHYS 112. Core courses in mechanics and electromagnetism will normally be PHYS 318 and PHYS 327, respectively. The minimum 15 hours beyond the core must be composed of physics courses with numbers greater than 300 and must include the senior laboratory course PHYS 410. This means a physics concentration needs a minimum of 7 credit hours of laboratory work to complete the requirements. The accompanying table shows several typical course sequences by means of which the major requirements may be completed. The primary distinction among students who may follow the different sequences is the amount and level of pre-college work in calculus and in physics. Changes in these typical patterns will be common, as agreed on between student and major faculty adviser. Research work is encouraged of all majors. If this work is done as an independent project, PHYS 490, up to eight credits can be applied to the concentration.

Concentration outside Physics

The concentration will reflect the student's interest in some area related to physics. The array of courses that comprise the concentration must have internal coherence. The array will normally be worked out in conference with the major faculty adviser and must be approved by the adviser. Of the required 15 hours credit beyond the core, at least eight credits must be in courses numbered above 300. Students have chosen to concentrate in such topics as chemical physics, astrophysics, natural sciences, history and philosophy of science, computer science, meteorology, or econometrics. A combined biology-chemistry concentration is appropriate for pre-medical students or those who wish to prepare for work in biophysics. Students interested in a career in the teaching of science should consider the Teacher Education in Science and Mathematics (TESM) Program, which is administered by the Departments of Education and Mathematics and is described in detail in the College of Arts and Sciences section of this catalog. A concentration in "science education" would then typically include EDUC 402 and 403, both part of TESM, and two or more courses designed to broaden the student's background in general science and mathematics.

For students with concentrations outside physics, the core requirements in mechanics and electromagnetism can be appropriately met with PHYS 314 and PHYS 323, respectively.

Students with an astronomy concentration who might continue in that field in graduate school should use ASTRO 410, 431, 432 as part of the concentration; they are encouraged to use PHYS 318 and 327 to satisfy the core requirements in mechanics and electromagnetism.

Honors

A student may be granted honors in physics upon the recommendation of the Physics Advisers Committee of the physics faculty. There is no particular course structure or thesis requirement for honors.

Double Majors

Double majors including physics are possible and not at all uncommon. It should be noted, however, that any course used to satisfy a requirement of another major may be used in satisfaction of physics major requirements only if the student's concentration is *within* physics.

Courses with Overlapping Content

Because the department offers several courses with overlapping content, students should select courses carefully to meet the needs of their academic programs and to ensure credit for each course they take. Listed below are groups of courses with largely similar content. In general, students may receive credit for only one of the courses in each group.

PHYS 101, 112, 116, 207
PHYS 102, 208, 213, 217
PHYS 214, 218
PHYS 314, 318
PHYS 323, 327
PHYS 116, 216

Course Prerequisites

Prerequisites are specified in physics course descriptions to illustrate the materials that students should have mastered. Students who wish to plan programs different from those suggested by the prerequisite ordering are urged to discuss their preparation and background with a physics adviser or with the instructor in the course. In many cases an appropriate individual program can be worked out without exact adherence to the stated prerequisites.

Courses

Listed days and times are not definite but are unlikely to change. Days and times are not listed for 600-level courses.

PHYS 101 General Physics I (I)
Fall, summer 4-week or 8-week session. 4 credits. General introductory physics for nonphysics majors. Prerequisites: 3 years of high school mathematics, including some trigonometry. A student without high school physics should allow extra time for PHYS 101. Includes less mathematical analysis than PHYS 207, but more than PHYS 200–206, 209, 210. Enrollment may be limited. Fall introductory lec. R Aug. 24 or M Aug. 28, 7:30 P.M. D. Fitchen.

PHYS 101 emphasizes quantitative and conceptual understanding of the topics of introductory physics developed without use of calculus. The course is mostly self-paced in a mastery-oriented format including eight subject units and a final retention (review) unit. Most instruction occurs in the learning center using video-taped lectures, personal tutoring by staff, assigned laboratory exercises, and solutions of sample test questions at our web site. Unit testing is designed to measure mastery with a limit of three test tries taken at the time of the student's choice. Major topics for 101: kinematics, forces and dynamics, momentum, energy, fluid mechanics, waves and sound, thermal physics, kinetic theory, and thermodynamics. At the level of *Physics 5th edition* by Cutnell and Johnson.

PHYS 102 General Physics II (I)
Spring, summer 4-week or 8-week session. 4 credits. Prerequisite for PHYS 102: PHYS 101 or 112 or 207. Includes less mathematical analysis than PHYS 208, but more than PHYS 200–206, 209, 210. Enrollment may be limited. Spring introductory lec, M Jan. 24, 7:30 P.M. Staff.

PHYS 101–102 emphasizes quantitative and conceptual understanding of the topics of introductory physics developed without use of calculus. The course is mostly self-paced in a mastery-oriented format including eight subject units and a final retention (review) unit each term. Most instruction occurs in the learning center using video-taped lectures, personal tutoring by staff, assigned laboratory exercises, and solutions of sample test questions at our web site. Unit testing is designed to measure mastery with a limit of three test tries taken at the time of the student's choice. Major topics for 102: electricity and magnetism, optics, relativity, atomic, quantum, and nuclear physics. At the level of *Physics 5th edition* by Cutnell and Johnson.

PHYS 103 General Physics (I)
Summer. 4 credits. Prerequisite: 3 years of high school mathematics, including some trigonometry. A student without high school physics should allow extra time for PHYS 103. PHYS 103 is a more traditional version of PHYS 101. PHYS 103 is not appropriate for students majoring in physics or engineering; it is primarily for students majoring in the life sciences. Lectures and discussions: M-F 10:00–11:15; laboratories M W 2:00–5:00.

Basic principles treated quantitatively but without calculus. Topics include: kinematics; forces and fields; momentum, angular momentum, and energy; thermal physics and fluid mechanics; sound waves. Text at the level of *Physics, 5th edition,* by Cutnell and Johnson.

PHYS 112 Physics I: Mechanics (I)
Fall, spring, summer 6-week session. 4 credits. Primarily for students of engineering and for prospective physics majors. Prerequisite: coregistration in MATH 192 (or 194 or 112), or substantial previous contact with introductory calculus combined with coregistration in MATH 111 or 191. Lec, M W F 10:10–11:00 or 12:20–1:10. Two rec. and one lab/cooperative learning session each week. Evening exams. Fall, A. LeClair; spring, staff.

Course covers the mechanics of particles with focus on: kinematics, dynamics, conservation laws, central force fields, periodic motion. Mechanics of many-particle systems: center of mass, rotational mechanics of a rigid body, and static equilibrium. At the level of *University Physics, Vol. 1,* by Young and Freedman.

PHYS 116 Physics I: Mechanics and Special Relativity (I)

Fall, spring. 4 credits. More analytic than PHYS 112, intended for students who will be comfortable with a deeper, somewhat more abstract approach. Intended mainly but not exclusively for prospective physics majors or applied and engineering physics majors. Prerequisites: a good secondary school physics course, familiarity with basic calculus, and enjoyment of puzzle-solving. Corrective transfers between PHYS 116 and PHYS 112 (in either direction) are encouraged during the first several weeks of instruction. Lec M W F 10:10–11:00.

A more rigorous version of PHYS 112, covering similar topics at the level of *An Introduction to Mechanics*, by Kleppner and Kolenkow.

PHYS 117 Concepts of Modern Physics

Fall. 1 credit. S-U only. Enrollment may be limited. Coregistration in PHYS 112 or 116 or 213 or 217 is required. For freshmen who plan to major in physics, applied and engineering physics, or astronomy. Lec, W 1:25–2:15 P.M. A. Sadoff.

This course is intended for freshmen who plan to major in physics or a closely related field (i.e., applied and engineering physics or astronomy) and would like to learn about the concepts of modern physics early in their physics education. Possible topics of discussion are methodology, symmetry and conservation laws, quantum theory, the unification of forces and matter, and big-bang cosmology.

PHYS 190 Supplemental Introductory Laboratory

Fall, spring. 1 credit. Times by arrangement with instructor. S-U only. Enrollment limited to students who have **all** of the following; (1) 3 transfer credits for introductory physics lecture material; (2) a degree requirement of the laboratory component of that introductory course; (3) approval of the director of undergraduate studies; and (4) permission of the lecturer of that course at Cornell. Enrollment limited.

A PHYS 190 Permission Form must be filed in 121 Clark Hall with the physics department course coordinator. Students perform the laboratory component of one of the introductory courses (PHYS 112, 213, 214) to complement the lecture-related course credit acquired elsewhere. Those wishing to take the equivalent of one of these introductory courses at another institution should receive prior approval from the director of undergraduate studies.

PHYS 200 Art, Archaeology, and Analysis (also GEOL 200, ENGRI 185, MS&E 285, ARKEO 285, and ART 372) (I or IV)

For description, see EAS 200.

PHYS 201 Why the Sky Is Blue: Aspects of the Physical World (I)

Fall. 3 credits. Lec, T R 2:55–4:10, rec, W 9:05–9:55 or 2:30–3:20 or 3:35–4:25. A. Sadoff.

This is a descriptive physics course aimed specifically at the nonscience student. There is an emphasis on the ideas of modern physics where the approach is both historical and thematic. The methodology of science and the nature of evidence is emphasized. An overriding theme is the character of physical laws as shown through the great principles of symmetry and conservation. While there are a few computational problems assigned, the purpose is to help students to understand the concepts rather than to master problem-solving techniques. At the level of *Physics Concepts and Connections* by Hobson.

PHYS 202 The World According to Physics—The Way Things Work (I)

Summer-3 week session. 3 credits. Prerequisite: 3 years of high school mathematics, including some trigonometry. M-F 10:00–12:00; laboratories 2 afternoons per week TBA. R. Lieberman.

Intended to provide students majoring in fields outside the sciences with an appreciation for the familiar physical world surrounding them. Which falls faster, a pound of gold or a pound of feathers? What trajectory does a launched rocket follow? Why are the curves on highways banked? What actually keeps a satellite circling the earth—why doesn't it just fall down or fly away? Can you build a ship that runs off the heat found in the ocean? With an emphasis on problem solving, the course helps the student develop skills transferable to other areas. Topics include: Newton's basic laws of motion, trajectories, satellites, space travel, and the concepts of energy.

PHYS 203 Physics of the Heavens and the Earth—A Synthesis (I)

Spring. 3 credits. Prerequisite: none; uses high school algebra and geometry. For nonscience majors. Lec T R 2:55–4:10; sec W 2:30–3:20 or 3:35–4:25. H. Padamsee.

This course shows how the unification of apparently distinct areas of physics leads to an explosion in the growth of our knowledge and understanding. The material is divided into three parts: the physics of motion on earth and motion in the heavens, showing how the two evolved separately, from the ideas of the ancient Greeks to the dynamics and telescopic discoveries of Galileo; the final melding of these two topics with Newton's Universal Gravitation; and an exploration of this "new" physics and its impact. There is an emphasis throughout on "how do we know the laws?" These are the stories of breakthrough discoveries and brilliant insights made by fascinating people, offering a humanistic perspective.

PHYS 205 Reasoning about Luck (I or II)

Fall. 3 credits. Intended for nonscientists; does not serve as a prerequisite for further science courses. Assumes no scientific background but uses high school algebra. Lec, M W 2:55–4:10; rec, T 2:30–3:20.

An attempt to explain how natural scientists can cope rationally with randomness. The first part of the course deals with the basic ideas of probability theory and explains why it is that in large systems likely events can become overwhelmingly likely. If we apply these ideas to gases consisting of very large numbers of molecules, an explanation of the true nature of heat follows. In this way, students are given a deep understanding of the second law of thermodynamics.

Probability enters into quantum mechanics in a more basic and somewhat mysterious way. We will spend the latter part of the course giving simple examples of the difference between classical and quantum probability. In particular, we discuss what is meant by an "entangled state" and how we know there are no hidden variables. At the level of *Reasoning About Luck: Probability and Its Uses in Physics* by Ambegaokar.

PHYS 206 Physics in the News (I)

Spring. 3 credits. Prerequisite: high school algebra. Intended for non-science majors. Does not serve as a prerequisite for further science courses. Lec T R 1:25–2:40. One rec. each week. N. Mistry.

"Physics in the News" examines the physics concepts behind the everyday news headlines. Typical topics include space exploration, global warming, medical imaging, magnetic levitation trains and electric cars, asteroid impacts, and other interesting headlines that may occur during the semester. This course is intended for non-science majors and is mainly descriptive. Our tools for understanding these topics are some of the most basic principles of physics, illustrated using algebra at the high school level. Detailed lecture notes are provided on the web. Readings are from the scientific press at the level of Scientific American and the text by Hobson listed below. Students are encouraged to explore the social and environmental aspects of some of the more debatable topics through articles and webpages. At the level of, Physics, Concepts and Connections, 2nd edition, by Art Hobson.

PHYS 207 Fundamentals of Physics I (I)

Fall. 4 credits. Prerequisites: high school physics plus MATH 111 or 191, or substantial previous contact with introductory calculus, combined with coregistration in a math course approved by instructor. Lec, M W F 9:05–9:55 or 11:15–12:05; two rec. and one lab each week. Evening exams. R. Thorne.

PHYS 207–208 is a two-semester introduction to physics, intended for students majoring in an analytically oriented biological science, a physical science, or mathematics with emphasis on applications and on quantitative tools generally applicable to the sciences.

Course covers: mechanics, conservation laws, waves, and topics from thermal physics, fluids, acoustics, and properties of matter. At the level of *Fundamentals of Physics*, Vol. I, 5th edition, by Halliday, Resnick, and Walker.

PHYS 208 Fundamentals of Physics II (I)

Spring. 4 credits. Prerequisites for PHYS 208: PHYS 207 or 112 or 101 and at least coregistration in MATH 112 or 192. PHYS 207–208 is a two-semester introduction to physics with emphasis on tools generally applicable in the sciences, intended for students majoring in a physical science, mathematics, or an analytically oriented biological science. Lec, M W F 9:05–9:55 or 11:15–12:05; two rec. and one lab each week. Evening exams. Staff.

Course covers electricity and magnetism, and topics from physical and geometrical optics, quantum and nuclear physics. At the level of *Fundamentals of Physics*, Vol II, 5th edition, by Halliday, Resnick, and Walker.

PHYS 209 Relativity and Chaos (I or II)

Spring. 3 credits. Intended for nonscientists; does not serve as a prerequisite for further science courses. Assumes no scientific background but uses high school algebra. Lec, T R 1:25–2:40; rec, M 2:30–3:20 or M 3:35–4:25.

We examine two revolutionary fields of classical physics, one venerable and one

relatively recent: the special theory of relativity is developed, with a view to understanding how certain simple but apparently contradictory facts about light lead to extraordinary insights into the nature of time; and the newer subject of "chaos" is explored, with a view to seeing how extremely simple rules can lead to behavior of breathtaking complexity.

PHYS 213 Physics II: Heat/ Electromagnetism (I)

Fall, spring, (summer 6-week session). 4 credits. Primarily for students of engineering and for prospective physics majors. Prerequisites: PHYS 112 and coregistration in the continuation of the mathematics sequence required for PHYS 112. Lec, T R 9:05–9:55 or 11:15–12:05, two rec. each week and six 2-hour labs. Evening exams. Fall, J. Rogers; spring, staff.

Course topics include: temperature, heat, thermal energy, electrostatics, behavior of matter in electric fields, DC circuits, magnetic fields, Faraday's law, Maxwell's equations, and electromagnetic oscillations. At the level of *University Physics/Vol. 1&2,* by Young and Freedman. Laboratory covers electrical measurements, circuits, and some aspects of heat transfer.

PHYS 214 Physics III: Optics, Waves, and Particles (I)

Fall, spring, (summer, 6 week session). 4 credits. Primarily for students of engineering and for prospective physics majors. Prerequisites: PHYS 213 and completion of a course in differential equations. Two rec. each week and one 3-hour lab alternate weeks. Evening exams. Lec, T R 9:05–9:55 or 11:15–12:05. Fall, T. Arias; spring, staff.

Physics of wave phenomena, electromagnetic waves, interference and diffraction effects, wave properties of particles and introduction to quantum physics. Course includes computer use in solving problems and labs. At the level of *University Physics, Vol. 1&2,* by Young and Freedman.

PHYS 216 Introduction to Special Relativity

Fall, spring, based on preregistration. 1 credit. S-U only. Enrollment may be limited. Course is completed within first 4 to 6 weeks of term. Coregistration in this course is a requirement for registration in PHYS 217, unless the student has taken a relativity course at the level of PHYS 116 or ASTRO 106. Prerequisites: PHYS 112 or PHYS 207 or permission of instructor. Lec, T R 8:00–8:50. Fall, J. Rogers; spring, staff.

Introduction to Einstein's Theory of Special Relativity including: Galilean and Lorentz transformations, the concept of simultaneity, time dilation and Lorentz contraction, the relativistic transformations of velocity, momentum and energy, and relativistic invariance in the laws of physics. At the level of *An Introduction to Mechanics* by Kleppner and Kolenkow.

PHYS 217 Physics II: Electricity and Magnetism (also A&EP 217) (I)

Fall, spring. 4 credits. Enrollment may be limited. Intended for students who have done very well in PHYS 112 or 116 and in mathematics and who desire a more analytic treatment than that of PHYS 213. Prospective physics majors are encouraged to select PHYS 217. Prerequisites: approval of student's adviser and permission from the instructor. A placement quiz may be given early in the semester, permitting those students who find PHYS 217 too abstract or analytical to transfer into PHYS 213, which they can do without difficulty at that time. Vector calculus is taught in this course, but previous contact, especially with the operations *grad*, *div*, and *curl*, is helpful. It is assumed the student has seen Special Relativity at the level of PHYS 116 or is currently enrolled in PHYS 216. It is also assumed that the student has covered the material of MATH 192 and is coregistered in MATH 293 or the equivalent. Lec, M W F 10:10–11:00. Fall, A. Sievers; spring, R. Buhrman.

At the level of *Electricity and Magnetism*, by Purcell (Vol. 2, Berkeley Physics Series).

PHYS 218 Physics III: Waves and Thermodynamics (I)

Fall, spring. 4 credits. Enrollment may be limited. Intended for students who have done very well in PHYS 116 and 217 and in mathematics, and who desire a more analytic treatment than that of PHYS 214. Prospective physics majors are encouraged to select PHYS 218. Prerequisites: PHYS 217 (with a grade of B or higher) and completion of a course in differential equations or permission of instructor. A placement quiz may be given early in the semester so that students who find PHYS 218 too demanding can transfer into PHYS 214. Lec, M W F 11:15–12:05. Fall, N. Ashcroft; spring, staff.

Topics covered in recent years have included oscillators, mechanical waves, electromagnetic waves, physical and geometrical optics, and the first and second laws of thermodynamics. Evening exams may be scheduled. At the level of *Physics of Waves* by Elmore and Heald.

PHYS 310 Intermediate Experimental Physics (I)

Spring. 3 credits. Enrollment may be limited. Prerequisite: PHYS 208 or 213. Labs T R 1:25–4:25.

Students select from a variety of experiments. An individual, independent approach is encouraged. Facilities of the PHYS 410 lab are available for some experiments.

PHYS 314 Intermediate Mechanics (I)

Spring. 4 credits. Prerequisites: PHYS 208 or 214 (or equivalent) and MATH 294 (or equivalent); Intended for physics majors with concentration outside of physics or astronomy; PHYS 318 covers similar material at a more analytical level. Lec. M W F 10:10–11:00, rec. F 1:25–2:15. C. Franck.

Likely topics include: Lagrangian mechanics; Newtonian mechanics based on a variational principle; conservation laws from symmetries; two-body orbits due to a central force; analysis of scattering experiments; small amplitude oscillating systems including normal modeanalysis; parametrically driven systems; rigid body motion; motion in non-inertial reference frames; and nonlinear behavior including bistability and chaos. Students not only become more familiar with analytic methods for solving problems in mechanics but also gain experience with computer tools. At the level of *Classical Dynamics* by Marion and Thorton.

PHYS 316 Modern Physics I (I)

Fall, spring. 3 credits. Prerequisites: PHYS 214 or 218 and coregistration in at least MATH 294 or equivalent. It is assumed that majors registering in PHYS 316 will continue with PHYS 317. Lec, M W F 9:05–9:55; rec, R 3:35–4:25. S. Teukolsky.

Course topics include: breakdown of classical concepts in microphysics; light quanta and matter waves; Schrödinger equation and solutions in 1 and 3 dimensions; and the hydrogen atom, exclusion principle, and spin and magnetic moments. At the level of *An Introduction to Quantum Physics* by French and Taylor.

PHYS 317 Modern Physics II (I)

Fall. 3 credits. Prerequisite: PHYS 316. Lec, M W F 9:05–9:55, rec, T 2:30–3:20. G. Dugan.

Course topics include: an investigation of quantum phenomena; atomic physics; classical and quantum statistical mechanics; molecules; solid state physics; nuclear physics and radioactivity; and elementary particle physics. At the level of *Modern Physics* by Serway.

PHYS 318 Analytical Mechanics (I)

Spring. 4 credits. Prerequisites: PHYS 116 or permission of instructor; A&EP 321 or MATH 420. Intended for junior physics majors concentrating in physics or astronomy. PHYS 314 covers similar material at a less demanding level. Lec, M W F 10:10–11:00; rec, F 2:30–3:20. M. Neubert.

Newtonian mechanics of particles and systems of particles, including rigid bodies; oscillating systems; gravitation and planetary motion; moving coordinate systems; Euler's equations; Lagrange and Hamilton formulations; normal modes and small vibrations; introduction to chaos. At the level of *Classical Mechanics* by Goldstein, *Classical Dynamics* by Marion and Thorton, and *Analytical Mechanics* by Hand and Finch. Supplementary reading is assigned.

PHYS 323 Intermediate Electricity and Magnetism (I)

Fall. 4 credits. Prerequisites: PHYS 208 or 213/214 (or equivalent) and MATH 293/ 294 (or equivalent); coregistration in A&EP 321 or MATH 420 recommended. Intended for physics majors with a concentration outside of physics or astronomy; PHYS 327 covers similar material at a more analytical level. Lec, M W F 11:15–12:05, rec, F 2:30–3:20. R. Talman.

Course topics include: electro/magnetostatics, boundary value problems, dielectric and magnetic media, Maxwell's Equations, electromagnetic waves, and sources of electromagnetic radiation. At the level of *Introduction to Electrodynamics* by Griffiths.

PHYS 327 Advanced Electricity and Magnetism (I)

Fall. 4 credits. Prerequisites: PHYS 217/218 or permission of instructor; coregistration in A&EP 321 or MATH 420. Intended for physics majors concentrating in physics or astronomy. PHYS 323 covers similar material at a less demanding level. N.B.: PHYS 327 assumes knowledge of the material at the level of PHYS 217, and makes extensive use of Fourier transforms. Lec, M W F 11:15–12:05, rec, F 2:30–3:20. L. Gibbons.

Course covers: electro/magneto-statics, vector and scalar potentials, Laplace's Equation and boundary value problems, multipoles; radiation-solutions to Maxwell's Equations,

energy-momentum of radiation; electrodynamics in media; and special relativity-transformations, four vectors, particle kinematics and dynamics, relativistic electrodynamics. At the level of *Classical Electromagnetic Radiation*, by Heald and Marion.

PHYS 330 Modern Experimental Optics (also A&EP 330) (I)

Fall. 4 credits. Enrollment limited. Prerequisite: PHYS 214 or equivalent. Lec, W 12:20–1:10; Lab, M T 1:25–4:25. M. Wang.

A practical laboratory course in basic and modern optics. The six projects cover a wide range of topics from geometrical optics to classical wave properties such as interference, diffraction, and polarization. Each experimental setup is equipped with standard, off-the-shelf optics and opto-mechanical components to provide the students with hands-on experience in practical laboratory techniques currently employed in physics, chemistry, biology, and engineering. Students are also introduced to digital imaging and image processing techniques. At the level of *Optics* by Hecht.

PHYS 341 Thermodynamics and Statistical Physics (I)

Fall. 4 credits. Prerequisites: PHYS 214, 316, and MATH 294. Lec, M W F 10:10–11:00, rec, R 2:30–3:20. V. Ambegaokar.

Course covers: statistical physics, developing both thermodynamics and statistical mechanics simultaneously. Also covers concepts of temperature, laws of thermodynamics, entropy, thermodynamic relations, and free energy. Applications to phase equilibrium, multicomponent systems, chemical reactions, and thermodynamic cycles. Application of statistical mechanics to physical systems, and introduction to treatment of Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics with applications. Elementary transport theory. At the level of *Fundamentals of Statistical and Thermal Physics*, by Reif, or *Introduction to Statistical Mechanics* by Betts.

PHYS 360 Electronic Circuits (also A&EP 363) (I)

Fall, spring. 4 credits. S-U grade option available by permission of the instructor for students who do not require this course for their major. Prerequisites: undergraduate course in electricity and magnetism (e.g., PHYS 208, 213, or 217) or permission of the instructor. No previous electronics experience is assumed, although the course moves quickly through introductory topics such as basic dc circuits. Fall term usually has a smaller enrollment. Lec, M 2:30–4:25. Labs T R or W F 1:25–4:25; evening labs M W 7:30–10:30 spring. Fall, E. Kirkland; spring R. Thorne.

Practical electronics as encountered in a scientific or engineering research/development environment. Analyze, design, build, and test circuits using discrete components and integrated circuits. Analog circuits: resistors, capacitors, filters, operational amplifiers, feedback amplifiers, oscillators, comparators, passive and active filters, diodes and transistor switches and amplifiers. Digital circuits: combinational and sequential logic (gates, flip-flops, registers, counters, timers), analog to digital (ADC) and digital to analog (DAC) conversion, signal averaging, computer architecture and interfacing. Additional topics may include analog and digital signal processing, light wave communications, transducers, and noise reduction techniques. At the level of *Art of Electronics* by Horowitz and Hill.

PHYS 400 Informal Advanced Laboratory

Fall, spring; (summer, 6 week session). Variable to 3 credits. (3 credits *NOT* variable in summer.) Prerequisites: 2 years of physics or permission of instructor. Lab T W 1:25–4:25. Fall, L. Hand; spring, D. Hartill.

Experiments of widely varying difficulty in one or more areas, as listed under PHYS 410, may be done to fill the student's special requirements.

PHYS 410 Advanced Experimental Physics

Fall, spring. 4 credits. Limited to seniors except by special permission. Prerequisites: PHYS 214 (or 310 or 360) plus 318 and 327, or permission of instructor. Lec, M 2:30–3:20, lab T W 1:25–4:25. Fall, L. Hand; spring, D. Hartill.

Selected topics in experimental concepts and techniques. About 60 different experiments are available in acoustics, optics, spectroscopy, electrical circuits, electronics and ionics, magnetic resonance, X-rays, low temperature, solid state, cosmic rays, and nuclear physics. The student performs three to six diverse experiments, depending on difficulty, selected to meet individual needs and interests. Independent work is stressed. Lectures are on experimental techniques used in experiments in the laboratory and on current research topics.

PHYS 443 Introductory Quantum Mechanics (I)

Spring. 4 credits. Prerequisites: PHYS 327 or 323; and PHYS 316 and A&EP 321 or MATH 420; coregistration in PHYS 314 or 318; or permission of instructor. Lec, M W F 9:05–9:55, rec, R 3:35–4:25. S. Teukolsky.

This course provides an introduction to concepts and techniques of quantum mechanics, at the level of *An Introduction to Quantum Mechanics*, by Griffiths.

PHYS 444 Nuclear and High-Energy Particle Physics (I)

Spring. 4 credits. Prerequisite: PHYS 443 or permission of instructor. Lec, M W F 9:05–9:55, rec, F 2:30–3:20. J. Rogers.

The course begins with a phenomenological description of atomic nuclei made of neutrons and protons. This includes what is measured and how one may use nuclear interactions as a source of energy. The study of proton-nuclear interactions led to the discovery of many new particles. The course then goes into the behavior of high-energy particles and radiation; elementary particles; basic properties of accelerators and detectors; general symmetries and conservation laws. At the level of *Concepts of Particle Physics*, by Gottfried and Weisskopf or *Modern Elementary Particle Physics* by Kane.

PHYS 451 Classical Mechanics, Nonlinear Dynamics, and Chaos (also PHYS 551) (I)

Spring. 3 credits. Only students with a strong performance in PHYS 318 or the equivalent will be admitted to the course. Biweekly two-hour seminar to be scheduled. Lec, T R 10:10–11:25. Next offered spring 2002. L. Hand.

This course provides an introduction to advanced topics in modern classical mechanics: methods of formulating both discrete and continuum Hamiltonian dynamics, classical field theory, canonical transformations, action-angle variables, the Hamilton-Jacobi equation, connection between classical and quantum mechanics, solvable, integrable, and nonintegrable systems, and KAM tori. Includes analytic techniques in nonlinear dynamics with examples chosen from a variety of systems of physical interest, phase-locking and fractional order resonances, and classification of bifurcations. Also covers dissipative and Hamiltonian chaos: logistic and standard maps, renormalization, KAM theorem, and quantum chaos. Some fluid dynamics and Sturm-Liouville theory included as time permits. The first part of the course is at the level of *Theoretical Mechanics of Particles and Continua*, by Fetter and Walecka; the second part is at the level of *Regular and Chaotic Dynamics*, 2nd edition, by Lichtenberg and Lieberman.

PHYS 454 Introductory Solid-State Physics (also A&EP 450) (I)

Fall. 4 credits. Prerequisite: PHYS 443, A&EP 361, or CHEM 793 is highly desirable but not required. Lec, M W F 9:05–9:55. Computer lab: W or R 2:30–4:25. F. Wise.

An introduction to modern solid-state physics, including crystal structure, lattice vibrations, electron theory of metals and semiconductors, and selected topics from magnetic properties, optical properties, superconductivity, and defects. At the level of *Introduction to Solid State Physics*, by Kittel, and *Solid State Physics*, by Ashcroft and Mermin.

PHYS 455 Geometrical Concepts in Physics (I)

Spring. 4 credits. Prerequisite: PHYS 323 or equivalent and at least coregistration in PHYS 318 or permission of instructor. Usually offered every other spring. Lec, T R 10:10–11:25. R. Talman.

Geometrical methods are an essential tool in modern theoretical physics and also provide deep insights into classical physics. This course introduces basic concepts from differential geometry, emphasizing calculational methods and illustrating their utility by drawing examples from mechanics, electrodynamics, and crystal diffraction. Tensors, differential forms, covariant and Lie derivatives, Lie algebra of vector fields, and gauge invariance are developed and employed. At the level of *Geometric Mechanics* by Talman.

[PHYS 456 Introduction to Accelerator Physics and Technology (also PHYS 656) (I)

Fall. 3 credits. Prerequisites: Intermediate E&M (PHYS 323 or 327) and Classical Mechanics (PHYS 314 or 318). Lec, T R 10:10–11:25. Not offered 2001–2002. G. Dugan.

Fundamental physical principles of particle accelerators and enabling technologies, with a focus on circular high energy colliders, such as the Cornell Electron Storage Ring (CESR). Includes beam optical design, the single-particle dynamics of transverse and longitudinal motion, the role of synchrotron radiation, nonlinear and coupled motion, and collective effects. The physics of some of the required technologies (radio frequency cavity systems, vacuum systems, and magnets) will be covered in seminars conducted by experts. At the level of *Introduction to the Physics of High Energy Accelerators* by Edwards and Syphers.]

[PHYS 457 The Storage Ring as a Source of Synchrotron Radiation (also PHYS 657) (I)

Spring. 3 credits. Prerequisites: intermediate level mechanics (PHYS 314 or 327) and E&M (PHYS 323 or 327) or permission of instructor. Previous completion of PHYS 456/656 is not required. Lec, T R 11:40–12:55. Not offered 2001–2002. S. Gruner and R. Talman.

This course covers physics of synchrotron radiation with a focus on characteristics of radiation from dipole magnets, electron beam properties that influence radiation characteristics, issues of flux, brightness, emittance, brilliance, beam stability, and beam lifetime. Regular lectures alternate with visitor lectures on specialized topics on radiation from insertion devices (i.e., wigglers and undulators,) x-ray optics, coupling to beams, and coherence in x-ray beams. There is special emphasis on understanding the requirements of experimental x-ray applications and hands-on opportunities for doing synchrotron radiation experiments. Course notes are made available on a web site.]

PHYS 480 Computational Physics (also PHYS 680 and ASTRO 690) (I)

Spring. 3 credits. S-U grades only. The course assumes familiarity with the standard mathematical methods for the physical sciences and engineering, differential equations and linear algebra in particular and with computer programming (e.g., Fortan or C). Lec, T R 8:40–9:55. T. Arias.

This course covers numerical methods for ordinary and partial differential equations, linear algebra and eigenvalue problems, nonlinear equations, and fast Fourier transforms from the hands-on perspective of how they are used in modern computational research in the era of open software and the web. The computer assignments which teach the material are designed also to achieve a larger goal: In the end, each student has developed his or her own working ab initio computer program for calculating the properties of molecules and materials with the methods which won Walter Kohn and John Pople the Nobel prize in Chemistry in 1998.

PHYS 481 Quantum Information Processing (also PHYS 681 and COM S 483)

Spring. 2 credits. S-U only. Lec, T R 1:25–2:15. N. David Mermin.

A technology firmly grounded on fundamental principles of quantum physics can spectacularly alter both the nature of computation and the means available for the transmission of information. Though implementation may be extremely difficult to achieve, the theory of quantum computation offers striking new perspectives on computation and information, as well as on the quantum theory itself. Topics include an introduction to the relevant principles of quantum physics, quantum cryptography, quantum bit commitment, teleportation, Shor's factoring algorithm, Grover's search algorithm, quantum circuits, and quantum error correction. The subject is developed in a manner suitable both for physicists, unfamiliar with computational complexity theory, and computer scientists and mathematicians, unfamiliar with the principles of quantum mechanics. Familiarity with the theory of vector spaces over the complex numbers is assumed.

PHYS 487 Selected Topics in Accelerator Technology (also PHYS 687)

Fall. 2 credits. S-U only. Prerequisites: intermediate E&M (PHYS 323 or 327). Lec, T R 11:40–12:55. Staff.

Fundamentals of accelerator technology. This course consists of a series of topical seminars covering the principal elements of accelerator technology. Each seminar consists of two to four lectures. The topics covered include magnet technology (normal, superconducting, and permanent), particle sources (both electrons and ions), rf technology (normal and superconducting), power conversion, vacuum technology (both warm and cold vacuum systems), feedback systems, general instrumentation and control systems, cryogenics systems, and survey and alignment.

PHYS 488 Introduction to Accelerator Physics and Technology (also PHYS 688) (I)

Fall. 3 credits. Prerequisites: Intermediate E&M (PHYS 323 or PHYS 327) and Classical Mechanics (PHYS 314 or PHYS 318). Lec, T R 10:10–11:25. A. G. Dugan.

Course covers fundamental physical principles of particle accelerators and enabling technologies, with a focus on circular high energy colliders, such as the Cornell Electron Storage Ring (CESR). Includes beam optical design, the single-particle dynamics of transverse and longitudinal motion, collective motion, the role of synchrotron radiation, and the interactions of colliding beams. The physics of some of the required technologies, such as radiofrequency cavity systems, vacuum systems, and magnets, is covered in seminars conducted by experts. At the level of *Introduction to the Physics of High Energy Accelerators* by Edwards and Syphers.

PHYS 490 Independent Study in Physics

Fall or spring. Variable to 4 credits. Students can apply a maximum of eight PHYS 490 credits to the physics major. Prerequisite: permission required of professor who will direct proposed work. A copy of the Request for Independent Study form must be filed with physics department course coordinator, 121 Clark Hall. Individual project work (reading or laboratory) in any branch of physics.

PHYS 500 Informal Graduate Laboratory

Fall, spring; summer. Variable to 2 credits. By permission of instructor. Experiments of widely varying difficulty in one or more areas, as listed under PHYS 510, may be done to fill student's special requirements.

PHYS 510 Advanced Experimental Physics

Fall, spring, summer. 3 credits. Lab, T W 1:25–4:25. An optional lecture associated with PHYS 410, M 2:30–4:25 is available. Fall, L. Hand; spring, D. Hartill.

About 60 different experiments are available in acoustics, optics, spectroscopy, electrical circuits, electronics and ionics, magnetic resonance, X-rays, low temperature, solid state, cosmic rays, and nuclear physics. Students perform four to eight experiments selected to meet individual needs. Independent work is stressed. Lectures include techniques used in experiments in the advanced laboratory and on current research topics.

PHYS 520 Projects in Experimental Physics

Fall, spring, summer. Variable to 3 credits. To be supervised by faculty member. Students must advise department course coordinator of faculty member responsible for their project. Prerequisite: PHYS 510.

Projects of modern topical interest that involve some independent development work by student. Opportunity for more initiative in experimental work than is possible in PHYS 510.

PHYS 525 Physics of Black Holes, White Dwarfs, and Neutron Stars (also ASTRO 511)

Spring. 4 credits. No astronomy or general relativity prerequisites. D. Lai.

This course covers the formation of compact objects: neutrino and gravitational radiation from supernova collapse and neutron stars; equilibrium configurations, equations of state, stability criteria, and mass limits; the influence of rotation and magnetic fields, pulsar phenomena, mass flow in binary systems; spherical and disk accretion; high-temperature radiation processes, compact X-ray sources; Gamma-Ray bursts; and high energy processes near supermassive blackholes, Quasars, and active galactic nuclei. Emphasis is on the application of fundamental physical principles to compact objects. Topics in diverse areas of physics are discussed including: solid-state physics, nuclear physics, relativity, fluid dynamics, and high-energy physics.

PHYS 551 Classical Mechanics, Nonlinear Dynamics, and Chaos (also PHYS 451)

Spring. 3 credits.

For description, see PHYS 451.

PHYS 553–554 General Relativity (also ASTRO 509–510)

553, fall; 554, spring. 4 credits. Prerequisite: knowledge of special relativity at the level of Classical Mechanics, by Goldstein. Lec, T R 1:25–2:40. E. Flanagan.

PHYS 553 is a systematic introduction to Einstein's theory, with emphasis on modern coordinate-free methods of computation. Topics include review of special relativity, modern differential geometry, foundations of general relativity, laws of physics in the presence of a gravitational field, and experimental tests of gravitation theories. At the level of *Gravitation*, by Misner, Thorne, and Wheeler. PHYS 554 is a continuation of 553 that emphasizes applications to astrophysics and cosmology. Topics include relativistic stars; gravitational collapse and black holes, gravitational waves, and cosmology.

PHYS 561 Classical Electrodynamics

Fall. 3 credits. T-M. Yan.

Course covers Maxwell's equations, electromagnetic potentials, electrodynamics of continuous media (selected topics), special relativity, and radiation theory. At the level of *Classical Electrodynamics*, by Jackson.

PHYS 562 Statistical Physics

Spring. 4 credits. Primarily for graduate students. Prerequisites: a good knowledge of quantum mechanics (at the level of Merzbacher), classical mechanics (at the level of Marion), and statistical mechanics (at the level of Reif). Lec, M W F 9:05–9:55. N. Ashcroft.

Course covers macroscopic or thermodynamic concepts including the laws of thermodynamics, thermodynamic functions, thermodynamic stability, and the thermodynamics of phase

equilibria. Other topics include: microscopic concepts including 1-, 2-, and N- particle quantum states; the micro-canonical, canonical and grand-canonical distributions; Bose-Einstein, Fermi-Dirac, and Boltzmann statistics; the density-matrix; and the microscopic-macroscopic connection. Applications include spin systems—the Ising and related models; strongly correlated fluids, and lattice-gases, including distribution and correlation functions, thermodynamic perturbation theory and introduction to critical phenomena and the renormalization group; dense Fermi- and Bose- systems; linear response of quantal and classical systems; transport properties; and the Boltzmann equation. At the level of *Statistical Mechanics* (2nd edition) by Pathria and *Statistical Mechanics of Phase Transition* by Yeomans.

PHYS 572 Quantum Mechanics (I)
Fall. 4 credits. Lec, M W F 11:15–12:05. P. Drell.
Course covers the general principles of quantum mechanics, formulated in the language of Dirac. Covers systems with few degrees of freedom: hydrogen atom, including fine and hyperfine structure; the deuteron; and atomic transitions. Theory of angular momentum, symmetries, perturbations and collisions are developed to analyze phenomena displayed by these systems. At the level of *Modern Quantum Mechanics* by Sakurai. A knowledge of the subject at the level of PHYS 443 is assumed, but the course is self-contained.

PHYS 574 Quantum Mechanics (II)
Spring. 4 credits. Lec, M W F 11:15–12:05. E. Flanagan.
Course covers systems with many degrees of freedom. Topics include: quantization of the electromagnetic field; interaction of light with matter; many electron atoms; second quantization for fermions; quantum liquids; scattering of complex systems; and an introduction to the Dirac equation. A knowledge of the concepts and techniques covered in PHYS 561 and 572 is assumed.

PHYS 599 Cosmology (also ASTRO 599)
For description, see ASTRO 599.

PHYS 635 Solid State Physics (I)
Fall. 3 credits. Prerequisites: a good undergraduate solid-state physics course, such as PHYS 454, as well as familiarity with graduate-level quantum mechanics. D. Ralph.
A survey of the physics of solids: crystal structures, x-ray diffraction, phonons, and electrons. Selected topics from semiconductors, magnetism, superconductivity, disordered materials, dielectric properties, and mesoscopic physics. At the level of *Solid State Physics* by Ashcroft and Mermin.

PHYS 636 Solid-State Physics (II)
Spring. 3 credits. Prerequisite: PHYS 635. P. Brouwer.
A continuation of PHYS 635. Topics covered include: Fermi Liquid Theory, magnetism, superconductivity, broken symmetries, elementary excitations, and other topics in quantum condensed matter physics not covered in *Solid State Physics* by Ashcroft and Mermin. These topics include: topological defects, superfluids, the quantum Hall effect, mesoscopic quantum transport theory, disordered systems, Anderson localization, and other metal insulator transitions.

PHYS 645 High-Energy Particle Physics
Fall. 3 credits. B. Gittelman.
Course serves as an introduction to physics of baryons, mesons, and leptons. Topics include: strong, electromagnetic, and weak interactions; relevance of symmetry laws to particle physics; and an introduction to the quark model. At the level of *The Experimental Foundations of Particle Physics*, by Cahn and Goldhaber.

PHYS 646 High-Energy Particle Physics
Spring. 3 credits. Staff.
This course covers: topics of current interest, such as high-energy electron and neutrino interactions, electron positron annihilation, and high-energy hadronic reactions. Lectures and reading material are at the level of *Introduction to High Energy Physics*, by Perkins and *Elementary Particle Physics* by Griffiths.

Note: **Only S-U grades are given in courses numbered 650 or above.**

PHYS 651 Relativistic Quantum Field Theory (I)
Fall. 3 credits. S-U grades only. M. Neubert.
Topics covered include consequences of causality and Lorentz invariance, field quantization, perturbation theory, calculation of cross sections and decay rates, and an introduction to radiative corrections and renormalization with applications to electromagnetic and weak interactions.

PHYS 652 Relativistic Quantum Field Theory (II)
Spring. 3 credits. S-U grades only. H. Tye.
This course is a continuation of PHYS 651 and introduces more advanced methods and concepts in quantum field theory. Topics include functional integral methods, quantization of non-abelian gauge theories, the renormalization group, and spontaneous symmetry breaking. Topics in cosmology, supersymmetry or superstring may be introduced. Applications to the electroweak theory and quantum chromodynamics are emphasized. At the level of *An Introduction to Quantum Field Theory* by Peskin and Schroeder.

PHYS 653 Statistical Physics
Fall. 3 credits. Normally taken by graduate students in their second or later years. Prerequisites: competence in the basic principles of quantum mechanics, statistical physics at the level of PHYS 562, and thermodynamics. S-U grades only. A. C. Henley.
Survey of topics in modern statistical physics including: Dynamical statistical physics (kinetic theory, Boltzmann equation, hydrodynamics); theory of simple fluids; scaling theories and the renormalization group; phase transitions in disordered systems; and pattern formation in nonlinear systems, percolation theory.

PHYS 654 Theory of Many-Particle Systems
Spring. 3 credits. Prerequisites: PHYS 562, 574, 635, 636, and 653 or permission of instructor. S-U grades only. Staff.
Equilibrium and transport properties of microscopic systems of many particles studied at zero and finite temperatures. Formalisms such as thermodynamic Green's functions are introduced and applied to such topics as normal and superconducting Fermi systems, superfluidity, magnetism, insulating crystals.

[PHYS 656 Introduction to Accelerator Physics and Technology (also PHYS 456)
Not offered 2001–2002.
See PHYS 456 for description.]

[PHYS 657 The Storage Ring as a Source of Synchrotron Radiation (also PHYS 457)
Not offered 2001–2002.
See PHYS 457 for description.]

[PHYS 661 Advanced Topics in High Energy Particle Theory
Fall. 3 credits. Prerequisites: PHYS 652. S-U grades only. Not offered 2001–2002.
This course presents advanced topics of current research interest. Subject matter varies from year to year. Some likely topics are two-dimensional conformal field theory with applications to string theory and condensed matter physics, applications of the electroweak theory, lattice gauge theory, mathematical methods (e.g. group theory), perturbative quantum chromodynamics, anomalies and geometry, supersymmetry, current algebra, heavy quark physics, heavy quark symmetry, and phenomenological issues beyond the standard model.]

PHYS 667 Theory of Stellar Structure and Evolution (also ASTRO 560)
For description, see ASTRO 560.

[PHYS 670 Instrumentation Seminar
Spring. 2 credits. S-U grades only. Not offered 2001–2002. J. Alexander.
Course covers conception, design, and performance of innovative instrumentation in condensed matter and elementary particle physics.]

PHYS 680 Computational Physics (also PHYS 480 and ASTRO 690)
For description, see PHYS 480.

PHYS 681–689 Special Topics
Offerings are announced each term. Typical topics are group theory, analyticity in particle physics, weak interactions, superfluids, stellar evolution, surface physics, Monte Carlo methods, low-temperature physics, magnetic resonance, phase transitions, and the renormalization group.

PHYS 681 Quantum Information Processing (also PHYS 481 and COM S 453)
See PHYS 481 for description.

PHYS 687 Selected Topics in Accelerator Technology (also PHYS 487)
See PHYS 487 for description.

PHYS 688 Introduction to Accelerator Physics and Technology (also PHYS 488)
Fall. 3 credits. Staff TBA.
For description, see PHYS 488.

PHYS 690 Independent Study in Physics
Fall or spring. Variable to 4 credits. Students must advise department course coordinator, 121 Clark Hall, of faculty member responsible for grading their project. S-U grades only. Special graduate study in some branch of physics, either theoretical or experimental, under the direction of any professorial member of the staff.

POLISH

See Department of Russian.

PORTUGUESE

See Department of Romance Studies.

PSYCHOLOGY

D. J. Bem, S. L. Bem, U. Bronfenbrenner, M. Christiansen, J. E. Cutting, R. B. Darlington, T. J. DeVoogd, D. A. Dunning, S. Edelman, D. J. Field, B. L. Finlay, E. J. Gibson, T. D. Gilovich, B. P. Halpern, A. M. Isen, S. J. Johnson, R. E. Johnston, C. L. Krumhansl, W. W. Lambert, D. A. Levitsky, J. B. Maas, U. Neisser, M. Owren, H. S. Porte, D. T. Regan, E. A. Regan, H. Segal, M. Spivey, B. J. Strupp

The major areas of psychology represented in the department are perceptual and cognitive psychology, biopsychology, and personality and social psychology. These areas are very broadly defined, and the courses are quite diverse. Biopsychology includes such things as animal learning, neuropsychology, interactions between hormones, other biochemical processes, and behavior. Perceptual and cognitive psychology includes such courses as cognition, perception, memory, and psycholinguistics. Personality and social psychology is represented by courses in social psychology and personality (such as Psychology and Law, Judgment and Decision Making, and Social Construction of Gender), as well as courses in fieldwork and psychopathology. In addition to the three major areas mentioned above, the department also emphasizes the statistical and logical analysis of psychological data and problems.

The Major

Admission to the major is usually granted to any student in good standing in the college who has passed three or more psychology courses with grades of C+ or better. Provisional admission requires two such courses. To apply to the major and receive an adviser, a major application form may be obtained from the department office (211 Uris Hall) and should be completed and taken to one of the faculty members whose name is listed on the form.

Requirements for the major are:

1) a total of 40 credits in psychology (including prerequisites), from which students majoring in psychology are expected to choose, in consultation with their advisers, a range of courses that covers the basic processes in psychology (laboratory and/or field experience is recommended); and
2) demonstration of proficiency in statistics before the beginning of the senior year. (See the section below on the statistics requirement.)

Normally it is expected that all undergraduate psychology majors will take at least one course in each of the following three areas of psychology:

1) **Perceptual and cognitive psychology**
2) **Biopsychology**
3) **Social, personality, and abnormal psychology**

The following classification of Department of Psychology offerings is intended to help students and their advisers choose courses that will ensure that such breadth is achieved.

1) **Perceptual and cognitive psychology:** PSYCH 205, 209, 214, 215, 292, 305, 311, 316, 342, 412, 413, 414, 415, 416, 417, 418, 419, 436, 492.
2) **Biopsychology:** PSYCH 223, 307, 322, 324, 326, 332, 361, 396, 420, 422, 424, 425, 429, 431, 440, 492.
3) **Social, personality, and abnormal psychology:** PSYCH 128, 265, 275, 277, 280, 281, 325, 327, 328, 402, 404, 450, 481, 489, 491.
4) **Other courses:** PSYCH 101, 199, 347, 350, 410, 440, 441, 470, 471, 472, 473, 475, 478, 479. The major adviser determines to which group, if any, these courses may be applied.

With the permission of the adviser, courses in other departments may be accepted toward the major requirements.

Fieldwork, independent study, and teaching. The department requires students to observe the following limits on fieldwork, independent study, and teaching.

1) Undergraduates may not serve as teaching assistants for psychology courses if they are serving as teaching assistants for any other course during the same semester.
2) An undergraduate psychology major cannot apply more than 12 of the credits earned in independent study (including honors work) and fieldwork toward the 40 credits required by the major.

Statistics requirement. Proficiency in statistics can be demonstrated in any one of the several ways listed below.

1) Passing PSYCH 350.
2) Passing an approved course or course sequence in statistics in some other department at Cornell. The approved list of courses and sequences may change. It has usually included SOC 301 and ILR 210 and 211. Requests that a particular course be added to this list may be made to Professor Gilovich.
3) Passing a course or course sequence in statistics at some other college, university, or college-level summer school. The course or sequence must be equivalent to at least six semester credits. The description of the course from the college catalog and the title and author of the textbook used must be submitted to Professor Gilovich for approval.
4) Passing an exemption examination. This examination can be given at virtually any time during the academic year if the student gives notice at least one week before. Students who have completed a theoretical statistics course in a department of mathematics or engineering and who wish to demonstrate competence in applied statistics usually find this option the easiest. Students planning this option should discuss it in advance with Professor Gilovich.

Concentration in biopsychology. Psychology majors interested in psychology as a biological science can elect to specialize in biopsychology. Students in this concentration must meet all of the general requirements for the major in psychology and must also demonstrate a solid background in biology; the physical sciences, including at least introductory chemistry; and mathematics. Students will design with their advisers an integrated program in biopsychology built around courses on physiological, chemical, anatomical, and ecological determinants of human and nonhuman behavior offered by the Department of Psychology. Additional courses in physiology, anatomy, biochemistry, neurochemistry, neurobiology, and behavioral biology may be designated as part of the psychology major after consultation between the student and his or her biopsychology adviser.

Concentration in personality and social psychology. Psychology majors who wish to specialize in social psychology are expected to meet the general requirements set by their department, including statistics. To ensure a solid interdisciplinary grounding, students in the concentration will be permitted to include some major courses in sociology and related fields. Advisers will assist students in the selection of a coherent set of courses from social organization, cultural anthropology, experimental psychology, social methodology, and several aspects of personality and social psychology. Seniors in the concentration may elect advanced and graduate seminars, with the permission of the instructor.

Undergraduate honors program. The honors program is designed for those exceptionally able students who wish to pursue an intensive and independent program of research in psychology. Successful participation in this program serves as evidence of the student's facility in the two most important skills of an academic psychologist: the capacity to acquire and integrate a substantial body of theoretical and factual material and the ability to engage in creative research activity. All qualified students planning on a graduate education in psychology or other academic fields should consider the honors program seriously. The program offers most students the closest contact and consultation with faculty that they will receive during their time at Cornell.

The core of the honors program is a research project that the student carries out in close collaboration with a faculty member in the field of psychology. It is assumed that most students will do so while enrolled in PSYCH 470 (Undergraduate Research in Psychology). A written report of the research is to be given to the chair of the honors committee (currently Professor Owren) toward the end of the last semester of the student's senior year. An oral defense of the thesis is then given before a committee of three faculty members, and the student presents his or her work in a public forum. Final honors standing (summa cum laude, magna cum laude, cum laude) is indicated on the student's diploma. The T. A. Ryan Award, accompanied by a cash prize, is awarded to the student who conducts the best honors project in a given year.

A student may formally apply to the honors program at any time during the senior year provided that she or he is actively engaged in independent research. However, students

must do so by the second week of November. Applications should be given to Professor Owren and should be made directly by the student.

Distribution Requirement

The distribution requirement in the social sciences is satisfied by any two courses in psychology with the exception of PSYCH 223, 307, 322, 324, 326, 332, 350, 361, 396, 410, 420, 422, 424, 425, 429, 431, 440, 441, 470, 471, 472, 473, 475, 478, 479, 491, 492.

Note: The Department of Psychology has listed all days and times for each course that we offer. If there should be changes in the days, times, or semester that a course is offered, we will post the necessary changes throughout the department and in the supplements of the Course and Time and Course and Room Rosters. Changes are also available on the web site, comp9.psych.cornell.edu.

Courses

PSYCH 101 Introduction to Psychology: The Frontiers of Psychological Inquiry (III)

Fall. 3 credits. Students who would like to take a discussion seminar should also enroll in PSYCH 103. M W F 10:10. J. B. Maas.

The study of human behavior. Topics include brain functioning and mind control, psychophysiology of sleep and dreaming, psychological testing, perception, learning, cognition, memory, language, motivation, personality, abnormal behavior, psychotherapy, social psychology, and other aspects of applied psychology. Emphasis is on developing skills to critically evaluate claims made about human behavior.

PSYCH 102 Introduction to Cognitive Science (also COGST 101, COMS 101, LING 170, PHIL 191) (III)

Fall. 3 or 4 credits (the four-credit option involves a writing section instead of taking exams). T R 11:40–12:55. M. Spivey.

This course surveys the study of how the mind/brain works. We examine how intelligent information processing can arise from biological and artificial systems. The course draws primarily from five disciplines that make major contributions to cognitive science: philosophy, psychology, neuroscience, linguistics, and computer science. The first part of the course introduces the roles played by these disciplines in cognitive science. The second part of the course focuses on how each of these disciplines contributes to the study of five topics in cognitive science: language, vision, learning and memory, action, and artificial intelligence.

PSYCH 103 Introductory Psychology Seminars

Fall. 1 credit. Limited to 300 students. Prerequisite: concurrent enrollment in PSYCH 101. Hours TBA. 12 different time options. J. B. Maas and staff.

A weekly seminar that may be taken in addition to PSYCH 101 to provide an in-depth exploration of selected areas in the field of psychology. Involves extensive discussion and a term paper related to the seminar topic. Choice of seminar topics and meeting times are available at the second lecture of PSYCH 101.

PSYCH 111 Brain Mind and Behavior (also BIONB 111 and COGST 111) (I)

Spring. 3 credits. Letter grades only. No prerequisites. Intended for freshman and sophomores in the humanities and social sciences; seniors by permission only. Not recommended for psychology majors; biology majors may not use the course for credit toward the major. M W F 9:05. E. Adkins Regan and R. Hoy.

Understanding how the brain creates complex human behavior and mental life is a great scientific frontier of the next century. This course enables students with little scientific background from any college or major to appreciate the excitement. What are the interesting and important questions? How are researchers trying to answer them? What are they discovering? Why did the brain evolve this remarkable capacity?

PSYCH 201 Cognitive Science in Context Laboratory (also COGST 201 and COM S 201) (III)

Spring. 4 credits. Prerequisite: PSYCH 102/COG ST 101/COM S 101/LING 170/PHIL 191, Introduction to Cognitive Science. Knowledge of programming languages is not assumed. Limited to 24 students. Disc and demos, M W 11:15–12:05; lab, M W 1:25–3:25, plus additional hours to be arranged. Uris Hall 259. D. Field and staff.

A laboratory course that explores the theories of cognitive science and provides direct experience with the techniques of cognitive science, in relation to the full range of both present and anticipated future activities in the workplace, the classroom, and in everyday life. Discussions of laboratory exercise results, supplementation of laboratory topics, and analyses of challenging primary research literature are done in meetings of the entire class. Laboratory exercises, which are done on an individual or small group basis, include both pre-planned investigations and student-developed experiments. Use of digital computers as well as the Internet, electronic mail, and web sites are integral components of the course.

The focus is on human-computer interactions that are intended to permit effective and efficient exchange of information and control of functions or operations. This approach is applied to real life settings. Students are expected to come to each discussion meeting having read and thought about assigned materials, and to come to scheduled laboratory meetings fully prepared to perform the laboratory exercises. Laboratory facilities are available to students at all times so that statistical analysis of data, preparation of laboratory reports, and collection of experimental data is facilitated.

PSYCH 205 Perception (III)

Spring. 3 credits. Open to first-year students. Graduate students, see PSYCH 605. T R 11:40–12:55. J. E. Cutting.

One of four introductory courses in cognitive psychology. Basic perceptual concepts and phenomena are discussed with emphasis on stimulus variables and sensory mechanisms. All sensory modalities are considered. Visual and auditory perception are discussed in detail.

PSYCH 209 Developmental Psychology (III)

Spring. 4 credits. Graduate students, see PSYCH 709. M W 2:55–4:10. S. Johnson.

One of four introductory courses in cognition and perception. A comprehensive introduction to current thinking and research in developmental psychology that approaches problems primarily from a cognitive perspective. The course focuses on the development of perception, action, cognition, language and social understanding in infancy and early childhood.

PSYCH 214 Issues in Cognitive Psychology (also COGST 214) (III)

Fall. 3 or 4 credits (the 4-credit option involves some participation in COGST/PSYCH 501). Sophomore standing required. Limited to 150 students. Graduated students, see PSYCH 614. M W F 11:15. S. Edelman.

A broad overview of problems arising in the study of cognition and of the information-processing, or computational, approaches to solving these problems, in natural and artificial cognitive systems. Theoretical and experimental challenges posed by the understanding of perception, attention and consciousness, memory, thinking, and language will be discussed and analyzed. Participants acquire conceptual tools essential for following the current debates on the nature of mind and its relationship to the brain.

[PSYCH 216 Cognitive Psychology Lab

Fall. 1 credit. Limited to 16 students. Prerequisite: concurrent enrollment in PSYCH 214. Hours TBA. Not offered 2001–2002. Staff.

If you've ever wondered how humans manage to represent their visual world, why telephone numbers are seven digits long, why imagery works as a mnemonic device, why certain things are better remembered than others, whether bilinguals are disadvantaged relative to monolinguals, how children acquire knowledge of the world, or how people make decisions—this laboratory is for you! A weekly lab meeting that encourages students to discover the scientist in themselves through the study of cognition. Much of cognitive research takes place in the laboratory and this course allows students to become familiar with the "how-to" of such research. Students are given six to eight basic experiments to explore and tinker with. They are encouraged to pose "what if" questions and eventually test them. The course promotes independent thinking, problem solving in an experimental setting, proposing and testing of one's own hypotheses, relating laboratory cognition to the real world, and communication of scientific ideas through informal and formal writing and oral assignments. Be prepared for an interactive learning experience.]

PSYCH 223 Introduction to Biopsychology (I:supplementary list)

Fall. 3 credits. M W F 10:10. No prerequisites. Can be used to satisfy the psychology major breadth requirement and as an alternative prerequisite for upper-level biopsychology courses. M. J. Owren.

An introduction to psychology from a biological perspective, including both evolutionary and physiological approaches to behavior. Topics include the structure and function of the nervous system, genetic and biochemical models of behavior, hormones and behavior, biological bases of learning, cognition, communication, and language, and the evolution of social organization.

Introductory courses in social and personality psychology. Each of the following four courses (265, 275, 277, 280) provides an introduction to a major area of study within social and personality psychology. These courses are independent of one another, and none have any prerequisites. Students may take any one of the courses or any combination of them (including all four). Courses may be taken in any order or simultaneously.

PSYCH 265 Psychology and Law (III)
Fall. 3 credits. M W F 1:25. D. A. Dunning.
This course examines the implications of psychological theory and methods for law and the criminal justice system. We concentrate on psychological research on legal topics (e.g., confession, eyewitness testimony, jury decision making, homicide, aggression, the prison system), social issues (e.g., death penalty, affirmative action), and on psychologists as participants in the legal system (e.g., assessing insanity and dangerousness and for expert testimony).

PSYCH 275 Introduction to Personality Psychology (also HD 260) (III)
Spring. 3 credits. Recommended: introductory course in psychology or human development. T R 1:25–2:40. D. Bem.
This course is designed as an introduction to theory and research in the area of personality psychology, with special emphasis on personality development. It covers the major influences including genetic, environmental, and gene-environment interactions, and involves in-depth study of the major theories. The assumptions and models of human behavior that form the basis of each theoretical orientation are examined and compared, and the relevant empirical evidence reviewed and evaluated. In addition, basic psychometric concepts and the methods for measuring and assessing personality are covered, as will the major related debates and controversies.

[PSYCH 277 Social Construction of Gender (also WOMNS 277) (III)
Fall. 3 credits. Limited to 180 students. T R 2:55–4:10. Not offered 2001–2002. S. L. Bem.
PSYCH/WOMNS 277 is an interdisciplinary course that addresses two broad questions: How an individual's gender and sexuality constructed? And how are hidden assumptions or "lenses" embedded in our social institutions, cultural discourses, and individual psyches perpetuate male power and oppress women and sexual minorities? Three lenses in particular are emphasized: androcentrism, gender polarization, and biological essentialism. A fundamental assumption of the course is that social science has worried too much about difference per se and too little about how even our most neutral-looking institutions invisibly transform difference into disadvantage. Although some attention is given to biological perspectives, the course emphasizes the cultural and psychological processes whereby the historically contingent comes to appear as the natural. Among some of the many topics discussed are the importance of looking at biology in context, the parental "instinct," androcentrism in law, sexual orientation cross-culturally, egalitarian relationships, gender-liberated child-rearing, and homophobia.]

PSYCH 280 Introduction to Social Psychology (III)
Spring. 3 credits. T R 1:25–2:40. D. T. Regan.
An introduction to research and theory in social psychology. Topics include social influence, persuasion, and attitude change; social interaction and group phenomena; altruism and aggression; stereotyping and prejudice; and everyday reasoning and judgment.

[PSYCH 281 Foundations of Clinical Practice (also HD 281) (III)
Fall. 3 credits. Limited to 60 students (30 PSYCH/30 HD). No prerequisites. Not offered 2001–2002. Staff.
This course provides an introduction to the theoretical and practical aspects of some basic elements of counseling. Students develop an understanding of the most current research on the elements of counseling and basic theoretical foundations underlying different approaches. Students are expected to acquire and demonstrate elementary helping skills. Through role-play, observation of videos, and in-class demonstrations, students learn such skills as attending and active listening; they also develop a capacity to recognize internal conflicts and cognitive distortions as well as the similarities between intra-psychic and interpersonal processes. Other topics include issues of transference and counter transference, the multi-axial dimensions of the DSMIV, defensive strategies as they appear in the DSMIV and ethical considerations and practice. While this course provides an introduction to the applied aspects of psychology, it does not prepare students to provide treatment of any sort.]

PSYCH 282 Community Outreach (also HD 282)
Fall and spring. 2 credits. Prerequisites: PSYCH 101 or HD 115. Students may not concurrently register with PSYCH 327 or PSYCH 328. T 10:10–11:25. H. Segal.
This course provides students with information and perspectives essential to volunteer field work with human and social service programs in the community. To gain a practical understanding of what mental health professionals do in the workplace, students examine problems that emerge in fieldwork settings which raise ethical, methodological, theoretical, and practical issues in the observation or treatment of clients or patients. Although students are not required to volunteer at a local agency, the instructor will assist students in finding sites that may provide appropriate learning opportunities. A paper, relating current research to issues relevant to community mental health, is due at the end of the course.

PSYCH 292 Intelligence (III)
Spring. 4 credits. Prerequisites: one 200-level course in psychology. M W TBA. Section meetings on Friday. U. Neisser.
A scientific overview of the controversial issues that surround intelligence tests and what they measure. Topics include the history of testing, correlates of test scores, alternative approaches to mental ability, genetic and environmental contributions to diversity in intelligence, effects of schooling, worldwide IQ gains, cultural factors, and group differences.

PSYCH 305 Visual Perception (III)
Fall. 4 credits. Limited to 25 students. Prerequisite: PSYCH 205 or permission of instructor. M W F 11:15. J. E. Cutting.
A detailed examination of pictures and their comparison to the real world. Linear perspective in Renaissance art, photography, cinema, and video are discussed in light of contemporary research in perception and cognition.

[PSYCH 307 Chemosensory Perception (III)
Fall. 3 or 4 credits; the optional (or fourth) credit is for an independent research project. Graduate students, see PSYCH 607. Not offered 2001–2002. T R 9:05. B. P. Halpern.
An examination of basic theory, data, and processes for perception of the chemosensory environment. Includes a very brief (about two weeks) lecture survey of the anatomy and physiology of human taste and olfaction, the remainder of the course uses the Socratic method, in which the instructor asks questions of the students, to cover topics such as chemosensory psychophysics, saliva, chemosensory bases for the tastes of foods, taste-smell interactions, chemosensory function in neonates and in the aged, temporal aspects of tasting, sweetness, effects of pollution of the chemosensory environment, and interactions between body state and chemosensory stimuli. At the level of *Smell and Taste in Health and Disease,* edited by T.V. Getchell et al., *Sensory Science Theory and Applications in Foods*, edited by H. T. Lawless and B. Klein; *Sensory Analysis of Foods*, 2nd edition, edited by J. R. Piggott.]

[PSYCH 311 Introduction to Human Memory (III)
Spring. 3 credits. Limited to 40 students. Some familiarity with statistical methods and experimental design and with the study of cognition is desirable. Graduate students, see PSYCH 611. T R 11:40–12:55. Not offered 2001–2002. Staff.
This course offers an overview of experimental findings and theoretical issues in the study of human memory. Coverage includes topics such as the nature of memory, various memory systems, coding and retrieval processes, practice and habit acquisition, organization for learning and memory, interference and forgetting, models of memory, and memory dysfunction and its relation to normal memory.]

PSYCH 313 Problematic Behavior in Adolescence (also HD 313) (III)
Fall. 3 credits. Prerequisite: HD 115 or PSYCH 101; HD 216 recommended. M W 2:55–4:10. J. Haugaard.
This course explores several problematic behaviors of adolescence, including depression, drug abuse, eating disorders, and delinquency. Various psychological, sociological, and biological explanations for the behaviors are presented. Appropriate research is reviewed; treatment and prevention strategies are explored. An optional discussion section is available to students who would like an opportunity to discuss readings and lectures in greater depth.

PSYCH 316 Auditory Perception (III)
Fall. 3 or 4 credits; the 4-credit option involves a laboratory project or paper. Prerequisite: PSYCH 205, 209, 214 (other psychology, linguistics, or biology courses could serve as prerequisite with permis-

sion of the instructor). Limited to 30 students. Graduate students, see PSYCH 716. M W 2:55–4:10. C. L. Krumhansl.
A course that covers the major topics in auditory perception including: physics of sound; structure and function of the auditory system; perception of loudness, pitch, and spatial location, with applications to speech production and perception; and music and environmental sounds.

[PSYCH 322 Hormones and Behavior (also BIONB 322) (I)
Fall. 3 credits. Two lectures plus a section in which students read and discuss original papers in the field, give an oral presentation, and write a term paper. Limited to juniors and seniors. Prerequisites: any one of the following: (a) PSYCH 223, (b) BIONB 221, (c) BIONB 222, or (d) one year of introductory biology plus a course in psychology. Letter grade only. Graduate students see PSYCH 722. M W F 11:15. Not offered 2001–2002. E. Adkins Regan.
The major focuses of the course are comparative and evolutionary approaches to the study of the relationship between reproductive hormones and sexual behavior in vertebrates, including humans. Also included are hormonal contributions to parental behavior, aggression, stress, learning and memory, and biological rhythms.]

PSYCH 324 Biopsychology Laboratory (also BIONB 324) (I)
Fall. 4 credits. Limited to 20 juniors and seniors. Prerequisites: PSYCH 223 or BIONB 221 or 222, and permission of instructor. T R 1:25–4:25. T. J. DeVoogd.
Experiments designed to provide experience in animal behavior (including learning) and its neural and hormonal mechanisms. A variety of techniques, species, and behavior patterns are included.

PSYCH 325 Adult Psychopathology (also HD 370) (III)
Spring. 3 credits. Limited to sophomores, juniors, and seniors. Prerequisites: any one course in Psychology or Human Development. M W 2:55–4:10. S. Bem.
A research-based introduction to the biological, psychological, and social (including cultural and historical) aspects of adult psychopathology. The major mental illnesses are covered, including (among others) schizophrenia, mood disorders, anxiety disorders, and personality disorders. Childhood disorders are not covered.

PSYCH 326 Evolution of Human Behavior (I:supplementary list)
Spring. 4 credits. Prerequisite: PSYCH 223, or an introductory biology course, or an introductory anthropology course. Graduate students, see PSYCH 626. T R 2:55–4:10. R. E. Johnston.
A broad comparative approach to the behavior of animals and humans with special emphasis on the evolution of human behavior. Topics covered vary but include some of the following: human evolution, evolutionary and sociobiological theory, animal communication, nonverbal communication, language, cognitive capacities, social behavior and organization, cooperation and altruism, sexual behavior, mating and marriage systems, aggression, and warfare.

PSYCH 327 Field Practicum I (also HD 327) (III)
Fall only. 3 credits. Prerequisites: PSYCH 325 or HD 370 (or taken concurrently), and permission of instructor. No S-U grades. Enrollment is limited to 30 students. Fee: $25 each semester. Enrolled students must commit to taking PSYCH 328 in the spring semester. No S-U option. M W 8:40–9:50. H. Segal.
This course is composed of three components which form an intensive undergraduate field practicum. First, students spend three to six hours a week at local mental health agencies, schools, or nursing facilities working directly with children, adolescents, or adults; supervision is provided by host agency staff. Second, Cornell faculty provide additional weekly educational supervision for each student. Third, seminar meetings cover issues of adult and developmental psychopathology, clinical technique, case studies, and current research issues. Students write two short papers, two final take-home exams, and present an account of their field experience in class.

PSYCH 328 Field Practicum II (also HD 328) (III)
Spring. 3 credits. Prerequisites: PSYCH 327 taken the previous term, PSYCH 325 or HD 370 (or taken concurrently), permission of instructor. No S-U grades. Enrollment is limited to 30 students. Fee: $25 each semester. M W 8:40–9:50. H. Segal.
This course continues the field practicum experience from PSYCH 327. Students spend three to six hours a week at local mental health agencies, schools, or skilled nursing facilities working directly with children, adolescents, or adults; supervision is provided by host agency staff.

PSYCH 332 Biopsychology of Learning and Memory (also BIONB 328) (I)
Spring. 3 credits. Prerequisites: 1 year of biology and either a biopsychology class or BIONB 222. Limited to 60 students. Graduate students, see PSYCH 632. M W F 11:15. T. J. DeVoogd.
This course surveys the approaches that have been or are currently being used in order to understand the biological bases for learning and memory. Topics include invertebrate, "simple system" approaches, imprinting, avian song learning, hippocampal and cerebellar function, and human pathology. Many of the readings are from primary literature.

PSYCH 342 Human Perception: Applications to Computer Graphics, Art, and Visual Display (also COGST 342) (III)
Fall. 3 or 4 credits. The 4-credit option involves a term paper. Prerequisite: PSYCH 101 or permission of instructor. PSYCH 205 strongly recommended. Graduate students, see PSYCH 642. T R 11:40–12:55. D. J. Field.
Our present technology allows us to transmit and display information through a variety of media. To make the most of these media channels, it is important to consider the limitations and abilities of the human observer. The course considers a number of applied aspects of human perception with an emphasis on the display of visual information. Topics covered include: "three-dimensional" display systems, color theory, spatial and temporal limitations of the visual systems, attempts at subliminal communication, and "visual" effects in film and television.

PSYCH 347 Psychology of Visual Communications (III)
Spring. 3 credits. Limited to 15 students. Prerequisites: PSYCH 101 and permission of instructor. R 10:10–12:05. J. B. Maas.
An exploration of theories of education, communication, perception, attitude, and behavior change as they relate to the effectiveness of visually based communication systems. Emphasis is on the use of photography and computer graphics to deliver educational messages.

PSYCH 350 Statistics and Research Design (II)
Fall. 4 credits. Limited to 120 students. M W F 9:05–9:55. T. D. Gilovich.
Acquaints the student with the elements of statistical description (measures of average, variation, correlation, etc.) and, more important, develops an understanding of statistical inference. Emphasis is placed on those statistical methods of principal relevance to psychology and related behavioral sciences.

PSYCH 361 Biopsychology of Normal and Abnormal Behavior (also NS 361)
Fall. 3 credits. Limited to 50 students in psychology and 50 students in nutritional sciences. Prerequisites: an introductory biology course and an introductory psychology course, or permission of instructor. S-U grades optional. Juniors and seniors only. M W F 9:05–9:55. B. J. Strupp.
A critical evaluation of factors thought to underlie normal and abnormal behavior and/or cognitive functioning. Psychological, biological, and societal influences are integrated. Topics include: the psychobiology of learning and memory; nutritional influences on behavior/cognition (e.g., sugar, food additives, choline); cognitive dysfunction (e.g., amnesia, Alzheimer's disease); developmental exposure to environmental toxins and drugs of abuse; and psychiatric disorders (depression, eating disorders).

PSYCH 396 Introduction to Sensory Systems (also BIONB 396) (I)
Spring. 4 credits. Limited to 25 students. Prerequisites: an introductory course in biology or biopsychology, plus a second course in behavior, biopsychology, cognitive science, neuroscience, or perception. Students are expected to have a knowledge of elementary physics, chemistry, and behavior. S-U grades optional. Offered alternate years. Class meetings, M W F 10:10. B. P. Halpern.
This course covers both those characteristics of sensory systems that are common across living organisms and those sensory properties that represent adaptations of animals to particular habitats, environments, or niches. The principles and limitations of major methods used to examine sensory systems are considered. Emphasis is on somesthetic, visual, and auditory systems. This course will be taught using the Socratic method, in which the instructor asks questions of the students. Students are assigned original literature in the form of printed or electronic journal articles or reviews and are expected to come to each class having read, thought about, and prepared to discuss the assigned readings and other assigned information resources. A course packet of reproduced articles, textbooks, a course web site, and Internet sites are used. Students submit brief analyses of, and comments and questions on, all assignments by email to the course's

electronic mailing list a day before each class meeting. The mailing list distributes submissions to all members of the class and to the instructor. In addition to these brief tri-weekly written exercises, a web site or a term paper on a topic germane to the course is required. All examinations are in take-home format. At the level of *From Sound to Synapse* by C. D. Geisler; *The Retina*, by J. E. Dowling. courseinfo.cit.cornell.edu/courses/psych_nbb_396/.

[PSYCH 401 Theoretical Approaches to Psychopathology and Treatment (III)
Fall. 3 credits. Limited to 20 students. Prerequisites: PSYCH 281 or 325. TBA. Not offered 2001–2002. Staff.
This course is designed to provide students with an overview of theoretical approaches to psychopathology and psychotherapy. It also aims to develop students' capacities to think in theoretical terms about psychological practice. We examine the theoretical and pragmatic features of major contemporary models of psychotherapy and explore the conceptual traditions on which they draw. Observation of the work of children and adolescents, audio-visual demonstrations, case presentations and discussions are included to advance students' understanding of the application of theory to practice. At the end of the course, students should be prepared to take a particular case and discuss the theoretical, practice, and research issues it raises, including intervention strategies. This course is not intended to provide students simply with an understanding of methods. It is organized around theory, research, and practice relevant to the treatment of several of the Disorders of Infancy and Childhood as well as specific disorders of Adults on Axis I and Axis II of DSM IV. Special attention is given to the work of: Daniel Stern, M.D. and Otto Kernberg, M.D.—Psychoanalytic revisionists; Lorna Benjamin, Ph.D.—Interpersonal Theory; Aaron Beck, M.D.—Cognitive Theory; and Marsha Linehan, Ph.D.—Behavioral and Cognitive-Behavioral Treatment]

[PSYCH 402 Current Research on Psychopathology: Depression (III)
Spring. 4 credits. Limited to 20 students. Prerequisite: PSYCH 325 or HD 370 and permission of the instructor. M 1:25–4:25. Not offered 2001–2002. Staff.
Current research and theory on the nature and etiology of depression. Approaches from various perspectives (biological, psychological, socio-cultural) are considered. Minimal attention given to psychotherapy and symptomatology.]

[PSYCH 404 Psychopathology and the Family (III)
Spring. 4 credits. Limited to 20 students. Prerequisite: PSYCH 325 or HD 370 and permission of the instructor. M 1:25–4:25. Not offered 2001–2002. Staff.
This course explores familial influences on the development of abnormal behavior. It examines how psychological, biological, and cultural factors in a family might contribute to such disorders as anorexia nervosa, depression, psychopathy, and psychosomatic illnesses. Emphasis is placed on early childhood experiences in the family and their impact on the development of later psychopathology. The course also discusses how the evolution of family structures in more recent times (e.g., the rise in day care and divorce) influences the individual. Family therapy approaches and techniques are also examined.]

PSYCH 410 Undergraduate Seminar in Psychology
Fall or spring. 2 credits. Nonmajors may be admitted, but psychology majors are given priority. Hours TBA. Staff.
Information on specific sections for each term, including instructor, prerequisites, and time and place, may be obtained from the Department of Psychology office, 211 Uris Hall.

[PSYCH 412 Laboratory in Cognition and Perception (III)
Spring. 4 credits. Limited to 15 students. Prerequisite: statistics and 1 course in cognition or perception is recommended. Graduate students, see PSYCH 612. Not offered 2001–2002. M W 2:55–4:10. D. J. Field.
A laboratory course is designed to introduce students to experimental methods in perception and cognitive psychology. Students take part in a number of classic experiments and develop at least one independent project. Computers are available and used in many of the experiments although computer literacy is not required. Projects are selected from the areas of visual perception, pattern recognition, memory, and concept learning.]

[PSYCH 413 Information Processing: Conscious and Nonconscious (III)
Spring. 4 credits. Prerequisites: at least 1 course in human experimental and permission of instructor; PSYCH 350 or equivalent will be useful for evaluating empirical articles. R 10:10–12:35. Not offered 2001–2002. Staff.
In the past decade, a not-so-quiet revolution has been taking place in the field of cognition regarding the problem of conscious mental computation. Data have come from patients with striking neuropsychological syndromes, i.e., the phenomenon of "blindsight" and the "amnesic" syndrome. This signature of independent mental computations has also been amply demonstrated in normal individuals in laboratory settings. We critically evaluate the theoretical worth and empirical justification of the distinction between "conscious" and "nonconscious" mental computations in normal and patient populations. Weekly readings are from, but not limited to, topics such as visual processes, face recognition, explicit and implicit memory, language processing and social cognition. Students are required to: lead and partake in advanced level discussions of classic and current papers; submit weekly summaries of the assigned readings; and write a term paper on a topic of their interest. Students should be prepared to read extensively.]

PSYCH 414 Comparative Cognition (also COGST 414) (III)
Spring. 3 credits. Prerequisites: PSYCH 205, 209, 214, or permission of instructor. Graduate students, see PSYCH 714. T R 2:55–4:10. M. J. Owren.
This course examines some of the conceptual and empirical work resulting from and fueling the recent surge of interest in animals' thinking. Specific topics may include: whether nonhumans behave intentionally; whether they show concept and category learning, memory, and abstract thinking similar to that of humans; the role of social cognition in the evolution of intelligence; and whether animals are conscious or self-aware. Evidence from communication studies in which animal signals provide a "window on the mind" play a strong role in the deliberations, including studies of naturally occurring signaling in various species and experiments in which nonhumans are trained in human-like language behavior. Cognition in nonhuman primates is a specific focus throughout. The course is a mix of lecture and discussion, emphasizing the latter as much as possible.

[PSYCH 415 Concepts, Categories, and Word Meanings (III)
Fall. 4 credits. Prerequisites: PSYCH 205, 209, 214, or 215, or permission of instructor. Graduate students, see PSYCH 615. M 1:25–4:25. Not offered 2001–2002. Staff.
A consideration of what types of categories are psychologically important, how they are represented and used through concepts, and how concept structure and semantic structure are interrelated. Different models of concept structure and categorization processes are evaluated, as are models of conceptual change and concept acquisition. Other topics include: relations between concepts and broader knowledge representation systems such as scripts, mental models, and intuitive theories; relative roles of associative information and beliefs in concept structure; categorization in other species; neuropsychological studies of categorization; comparisons of categorization systems across cultures; and comparisons of concept structures across different types of categories.]

PSYCH 416 Modeling Perception and Cognition (also COGST 416) (III)
Spring. 4 credits. Prerequisites: PSYCH 205, 209, 214, or 215, or permission of instructor. Graduate students, see PSYCH 616. M W F. M. Spivey.
This course offers a survey of several computational approaches to understanding perception and cognition. We explore linear systems analysis, connectionist models, dynamical systems, and production systems, to name a few. Emphasis is placed on how complex sensory information gets represented in these models, as well as how it gets processed. This course covers computational accounts of language processing, language acquisition, visual perception, and visual development, among other topics. Students complete a final project that applies a computational model to some perceptual/cognitive phenomena.

PSYCH 417 The Origins of Thought and Knowledge (III)
Fall. 4 credits. Prerequisite: permission of instructor. Graduate students, see PSYCH 717. M W 2:55–4:10. S. Johnson.
An in-depth analysis of current theories concerning the growth of thought and knowledge in infancy and early childhood. This course addresses the following questions: How do infants come to understand the objects and events they experience? What are the best methods for assessing development of perception, cognition, and language? How do developing perceptual, cognitive, and language skills constrain object perception? What are the applications of research on early perceptual and cognitive development to such fields as robotics and artificial intelligence?

[PSYCH 418 Psychology of Music (III)
Spring. 3 or 4 credits, depending on whether student elects to do an independent project. The course is intended for upper-level students in music, psychology, engineering, computer science, linguistics, physics, anthropology, biology, and related disciplines. Some music background is desirable but no specific musical skills (e.g. reading music) are required. Graduate students, see PSYCH 618. M W 2:55–4:10. Not offered 2001–2002. C. L. Krumhansl.
A course that covers the major topics in the psychology of music treated from a scientific perspective. It reviews recent developments in the cognitive science of music, beginning with music acoustics and synthesis, and extending to music and its emotional and social effects.]

[PSYCH 419 Neural Networks Laboratory
Spring. 4 credits. Prerequisites: at least 1 course in biology or biological psychology, 1 year of calculus, and permission of instructor. Limited to 15 students. Graduate students, see PSYCH 619. T R 2:55–4:10. Not offered 2001–2002. D. J. Field.
The course takes a hands-on approach to understanding the limitations and successful applications of neural networks to problems in cognitive and biological psychology. A variety of neural network architectures are discussed and explored using computer simulations. Applications of networks to perceptual recognition and representation are emphasized. We consider the class of problems that different networks can solve and consider the accuracy with which they model real nervous systems. Students complete weekly lab reports and develop one independent project demonstrating the application of a neural network to a problem discussed in the course.]

[PSYCH 422 Developmental Biopsychology
Fall. 4 credits. Prerequisites: a course in introductory biology and a course in biopsychology or neurobiology (such as PSYCH 223 or BIONB 221). Graduate students, see PSYCH 622. M W F 9:05–9:55. Not offered 2001–2002. B. L. Finlay.
We discuss the relationship of the development and evolution of the brain to the development of behavior. Topics include: how neurons are generated, finding targets, and establishing connections; the emergence of reflexive and complex behavior; how experience affects the developing brain; evolutionary perspectives on the development of perception, memory, and communication systems; and abnormal development.]

PSYCH 424 Neuroethology (also BIONB 424) (I)
Spring. 4 credits. Prerequisites: BIONB 221 or 222 or BIOG 101–102 and permission of instructor. S-U grades optional. M W F 11:15; disc, 1 hour each week TBA. C. D. Hopkins.
Neuroethologists take a comparative and evolutionary approach to study the nervous system. They ask, how do brains of animals compare and how did they come about through the process of evolution? How are neural circuits adapted to species-typical behavior? What is the hope and interest in the study of a large diversity of animals, compared to a specialized look at just a few mammalian species? Can we hope to understand how animals with specialized behaviors have specialized nervous systems? What is the sensory world of a real animal and how does it vary from species to species? These and other questions drive this introductory survey of neuroethology: exituc senses; amazing motor programs; surprising integration.

PSYCH 425 Cognitive Neuroscience
Fall. 4 credits. Prerequisites: a course in introductory biology and a course in biopsychology or neurobiology (such as PSYCH 223 or BIONB 221). Graduate students, see PSYCH 625. M W F 9:05–9:55. B. L. Finlay.
We study the relation between structure and function in the central nervous system. The importance of evolutionary and mechanistic approaches for understanding the human behavior and cognition is stressed. The course focuses on issues in cognitive neuroscience including: mechanisms of perception, particularly vision, and the neuropsychology of everyday acts involving complex cognitive skills such as recognition of individuals, navigation in the world, language, memory, social interaction and consciousness.

[PSYCH 429 Olfaction and Taste: Structure and Function (also BIONB 429) (I)
Fall. 3 or 4 credits (4-credit option requires a term paper or research project. The research project can, but does not need to, study nonhuman vertebrates). Preference given to junior and senior psychology and biology majors and graduate students. Prerequisite: one 300-level course in biopsychology or equivalent. Graduate students, see PSYCH 629. T R 9:05. Not offered 2001–2002. B. P. Halpern.
The structural and functional characteristics of olfaction and taste are explored by reading and discussing current literature in these areas. Structure is examined at the light levels of electron microscopes as well as at the molecular level. Function is primarily neurophysiological and biochemical aspects. The emphasis is on vertebrates, especially air-breathing vertebrates in the case of olfaction, but there is some coverage of invertebrate forms. At the level of *Smell and Taste in Health and Disease*, edited by T. V. Getchell, R. L. Doty, L. M. Bartoshuk, and J. B. Snow; *The Neurobiology of Taste and Smell*, edited by T. E. Finger and W. L. Silver.]

[PSYCH 431 Effects of Aging on Sensory and Perceptual Systems (also BIONB 421) (I)
Fall. 3 or 4 credits. The 4-credit option involves a term paper or creation of a relevant web site. Limited to 25 students. Prerequisites: an introductory course in biology or psychology, plus a second course in perception, neurobiology, cognitive science, or biopsychology. T R 10:10–11:25. Not offered 2001–2002. B. P. Halpern.
A literature-based examination of post-maturation changes in the perceptual, structural, and physiological characteristics of somesthetic, visual, auditory, and chemosensory systems. Emphasis is on human data, with nonhuman information included when especially relevant. Quality of Life issues are included. Current developments in human sensory prosthetic devices, and in regeneration or replacement of receptor structures or organs are examined. Brief written statements by e-mail of questions and problems related to each set of assigned readings are required in advance of each class meeting and are automatically distributed to all members of the class. This course is taught using the Socratic Method, in which the instructor asks questions of the students. Students read, analyze, and discuss in class difficult original literature dealing with the subject matter of the course. Readings are from the Course Info site, courseinfo.cit.cornell.edu/courses/psych431_nbb421/, from Internet sites, from a course packet, and from materials on reserve. Students are expected to come to each class having already done and thought about the assigned readings, and to take an active part in every class. All examinations are take-home.]

PSYCH 435 Olfaction, Pheromones, and Behavior (III)
Fall. 4 credits. Prerequisites: an introduction course in biology and one in neurobiology and behavior or biopsychology or a 300-level course in biopsychology or permission of instructor. R. Johnston.
This course covers chemical signals, olfaction, and behavior in vertebrates (including humans), as well as the neurobiology of olfaction and odor-mediated behaviors. Behavioral topics may vary from year to year but include evaluation of and advertisement for mates, aggression and territorial behavior, parental-young interactions, social recognition (species, sex, individual, kin reproductive state, status), memory for odors, odor and endocrine interactions, imprinting, and homing and navigation. Basic aspects of the structure and function of the olfactory system and also covered, including the molecular biology of chemo-reception, olfactory coding, and higher-order processing in the central nervous system. The format includes lectures, discussions, and student presentations.

PSYCH 436 Language Development (also COGST 436, HD 436, and LING 436) (III)
Spring. 4 credits. Open to undergraduate and graduate students. Graduate students should also enroll under HD 633/LING 700/PSYCH 600, a supplemental graduate seminar. Prerequisite: at least 1 course in developmental psychology, cognitive psychology, cognitive development, or linguistics. S-U grades optional. T R 2:55–4:10. B. Lust.
This course surveys basic issues, methods, and research in the study of first-language acquisition. Major theoretical positions in the field are considered in the light of experimental studies in first-language acquisition of phonology, syntax, and semantics from infancy on. The fundamental linguistic issues of "Universal Grammar" and the biological foundations for acquisition are discussed, as are the issues of relations between language and thought. The acquisition of communication systems in nonhuman species such as chimpanzees is addressed, but major emphasis is on the child. An optional lab course supplement is available. (See COGST 450/LING 450 and PSYCH 437.)

PSYCH 437 Lab Course: Language Development (also COGST 450, HD 437, and LING 450) (in conjunction with COGST/HD/LING 436, Language Development)
Spring. 2 credits. R 1:25. B. Lust.
This laboratory course is an optional supplement to the survey course, Language Development (HD/COGST/PSYCH/LING 436). The lab course provides students with a

hands-on introduction to scientific research, including design and methods, in the area of first language acquisition.

PSYCH 440 The Brain and Sleep
Fall. 4 credits. Prerequisites: at least PSYCH 223 or BIONB 221. An additional course in biology, biopsychology or neurobiology is recommended. S-U grades optional. Graduate students, see PSYCH 640. M W 2:55–4:10. H. S. Porte.
Taking a comparative evolutionary perspective, this course examines the neural events that instigate, maintain, and disturb the states and rhythms of sleep in various species. Emphasizing human data where possible, special topics include sleep deprivation and the biological functions of sleep; sleep's putative role in learning and memory; biologically interesting deviations from normal sleep; and the cognitive neuroscience of sleep.

PSYCH 441 Laboratory in Sleep Research
Spring. 4 credits. Prerequisites: PSYCH 440 or comparable preparation, and permission of the instructor during preregistration. Laboratory fee: $50. Graduate students, see PSYCH 641. W 7:30–10:30 P.M. H. S. Porte.
Emphasizing the neurobiology of sleep state, the course introduces students to the laboratory study of human sleep and its psychological correlates. Serving as both experimenter and subject, each student learns the physical rationale and techniques of electroencephalography and other bioelectric measures of behavioral state. Using computerized data analysis, students complete weekly laboratory reports and a collaborative term project. Sleep recordings are done during the day or evening when possible. In addition, overnight recording sessions are required.

PSYCH 450 The Lenses of Gender (also WOMNS 450) (III)
Fall. 4 credits. Limited to 15 juniors, seniors, and graduate students. Prerequisites: (1) junior, senior or graduate standing, with preference given to psychology majors and women's studies majors; (2) a prior course related to psychopathology (preferably PSYCH 325/HD 370); and (3) a prior course related to gender and/or sexuality. Permission of instructor required through an application process during the preceding spring semester. Graduate students, see PSYCH 650/WOMNS 650. Letter grade only. W 2:30–4:25. S. L. Bem.
This advanced undergraduate/graduate seminar takes up several interrelated topics at the intersection of clinical psychology and gender/sexuality. Possible topics include, among others, trauma, personality disorders, and psychiatry's troubled history in the domain of gender/sexuality. Course requirements generally include weekly informal written commentaries on the readings, a final essay examination, and your choice of either a term paper or a class presentation.

PSYCH 460 Human Neuroanatomy (also BIONB 420, sec 02) (I or III)
Spring. 3 or 4 credits (4 credits with one discussion/lab per week in which students dissect sheep brains, read original research papers and write a term paper). Prerequisites: PSYCH 223, or BIONB 222, or permission of the instructor. Permission required for 4-credit option. Limited to juniors, seniors and graduate students. S-U grades and auditing not permitted. Lecs, M W F 1:25; discussion section to be arranged. S. Newman.
Neuroanatomy is the substrate for the functional organization of the human nervous system. This course introduces the brain nuclei and major connecting pathways of functional neural systems: sensory, motor, and integrative. Our understanding of the functions of these systems is based in part on their dysfunction, on the symptoms of neurological and psychiatric diseases that damage or inactivate selected pathways. This course highlights neuroanatomical pathways and networks that are known, or hypothesized, to be dysfunctional in a variety of nervous system disorders.

PSYCH 465 Topics in High-Level Vision (also COGST 465 and COM S 392) (III)
Spring. 4 credits. Graduate students see PSYCH 665. S. Edelman.
High-level vision is a field of study concerned with functions such as visual object recognition and categorization, scene understanding, and reasoning about visual structure. It is an essentially cross-disciplinary endeavor, drawing on concepts and methods from neuroanatomy and neurophysiology, cognitive psychology, applied mathematics, computer science, and philosophy. The course concentrates on a critical examination of a collection of research publications, linked by a common thread, from the diverse perspectives offered by the different disciplines. Students write bi-weekly commentaries on the assigned papers and a term paper integrating the material covered in class.

PSYCH 470 Undergraduate Research in Psychology
Fall or spring. 1–4 credits. S-U grades optional. Written permission from the staff member who will supervise the work and assign the grade must be included with the course enrollment material. Students should enroll in the section listed for that staff member. A section list is available from the Department of Psychology. Hours TBA. Staff.
Practice in planning, conducting, and reporting independent laboratory, field, and/or library research.

PSYCH 471 Advanced Undergraduate Research in Psychology
Fall or spring. 1–4 credits. S-U grades optional. Written permission of the staff member who will supervise the work and assign the grade must be included with the course enrollment material. Students should enroll in the section listed for that staff member. A section list is available from the Department of Psychology. Hours TBA. Staff.
Advanced experience in planning, conducting, and reporting independent laboratory, field, and/or library research. One, and preferably two, semesters of PSYCH 470 is required. The research should be more independent and/or involve more demanding technical skills than that carried out in PSYCH 470.

PSYCH 472 Multiple Regression
Spring, weeks 1–7. 2 credits. Prerequisite: 1 solid semester of introductory statistics. Analysis of variance is helpful but not required. M W F 10:10. R. B. Darlington.
Course covers uses and pitfalls of multiple regression in causal analysis, path analysis, and prediction. Emphasis is on analyzing data collected under uncontrolled conditions. Includes colinearity, indicator variables, sets, adjusted and shrunken R^2, suppressors, hierarchical analysis, overcontrol, and experimental design. Students may use the Mystat, Minitab, SPSS, or Systat statistics packages.

PSYCH 473 General Linear Model
Spring, weeks 8–14. 2 credits. Prerequisite: PSYCH 472 or equivalent. M W F 10:10. R. B. Darlington.
Course topics include multicategorical variables, corrections for multiple tests, diagnostic methods, nonlinear relationships, interaction, main and simple effects, and basic power analysis. Student may use Mystat, Minitab, SPSS or Systat.

PSYCH 475 Multivariate Analysis of Psychological Data
Fall. 2 credits. Prerequisite: PSYCH 473 or permission of instructor. R 10:10–12:05. R. B. Darlington.
Students vote on topics to cover, choosing among time series, cluster analysis, multidimensional scaling, component analysis, factor analysis, MANOVA, canonical correlation, repeated measures, logistic regression, log-linear models, ANOVA with empty cells, meta-analysis, and other topics. First class sketches all these topics before vote.

[PSYCH 480 The Cornell Westchester/NY Hosp. Field Placements (III)
Full year. 7 credits. Spring through summer and fall. Prerequisites: PSYCH 325 or PSYCH 281 (for PSYCH), Biology or Chemistry with lab (pre-med). Sophomores or juniors only. Not offered 2001–2002. Staff.
The Cornell-Westchester/Payne Whitney field placement program makes available eight-week research/clinical internships for Cornell-Ithaca undergraduates who are pre-professional in psychology, neurobiology, psychiatry, or medicine. Each student is matched with a MD./Ph.D. mentor at the Cornell-Westchester or Payne Whitney hospital. Students work on one rotation throughout the summer and assist the researcher with his/her work. Students' work includes, but is not limited to, reading, reporting, observing, writing literature reviews, learning grant-writing, assisting in the conducting of experiments, and planning their own experiments.

Most placements involve a clinical component as well. *Under the supervision of the mentor*, students work in therapy groups with patients, participate in testing, and assist in psychological rehabilitative activities. The patient populations with whom students work are diverse with regard to age and diagnosis as well as race, culture, ethnicity, and national background.]

PSYCH 481 Advanced Social Psychology (III)
Fall. 4 credits. Limited to 20 students, by application. Senior psychology majors have priority. Graduate students, see PSYCH 681. T R 10:10–11:25. D. T. Regan.
Selected topics in social psychology are examined in depth with an emphasis on the relationship between experimental research and the development of theory. Readings are mostly primary sources. Among the theoretical approaches to social behavior we may discuss are social comparison theory, cognitive dissonance, attribution processes and social

judgment, dramaturgy and impression management, and evolutionary perspectives.

PSYCH 489 Seminar: Beliefs, Attitudes, and Ideologies (also PSYCH 689/ WOMNS 488/688) (III)
Fall. 4 credits. Prerequisites: admission is by application during the spring pre-registration period for the fall semester. Seniors and graduate students are given priority. M 2:30–4:25. D. J. Bem.
This course in cultural analysis examines the properties of beliefs and attitudes, how they are formed and changed, the psychological functions they serve, and how they get organized into ideologies. Several specific issues involved in America's "culture wars" are examined, such as abortion, gender, sexual orientation, and affirmative action. Other topics include the culture of childhood, deaf culture, and the ideologies of science. Participants write weekly commentaries on the readings and a term paper examining a particular ideology.

[PSYCH 491 Research Methods in Psychology
Spring. 4 credits. Enrollment limited to 15 students. Recommended: permission of instructor, PSYCH 350, experience in upper-division psychology courses, or graduate standing. Graduate students, see PSYCH 691. T R 10:10–11:25. Not offered 2001–2002. D. A. Dunning.
An intensive examination of the basic research methods used in social, personality, cognitive, and developmental psychology. The course focuses on designing and conducting experiments, i.e., how to turn vague theories into concrete and testable notions, evaluate studies, avoid common pitfalls, and, finally, remain ethical. Beyond learning methods of "correct" and rigorous experimentation, we also discuss what makes a research study actually interesting. The course in addition, covers test construction, survey methods, and "quasi experiments." Students concentrate on completing a small research project in which they conduct an experiment, interpret its data, and write up the results.]

[PSYCH 492 Sensory Function (also BIONB 492) (I)
Spring. 4 credits. Limited to 25 students. Prerequisite: a 300-level course in biopsychology, or BIONB 222 or BIOAP 311, or equivalent. Students are expected to have a knowledge of elementary physics, chemistry, and behavior. S-U grades optional. Graduate students, see PSYCH 692. Offered alternate years. M W F 10:10. Not offered 2001–2002.
B. P. Halpern and H. C. Howland.
In general, this course has covered classical topics in sensory function such as vision, hearing, touch, and balance, as well as some more modern topics like sensory processing, location of stimulus sources in space, the development of sensory system, and nonclassical topics such as electroreception and internal chemoreceptors.]

Advanced Courses and Seminars

Advanced seminars are primarily for graduate students, but with the permission of the instructor they may be taken by qualified undergraduates. The selection of seminars to be offered each term is determined by the needs of the students.

A supplement describing these advanced seminars is available at the beginning of each semester and can be obtained from the department office (211 Uris Hall). The following courses may be offered either term and carry four credits unless otherwise indicated.

PSYCH 501 Cognition (also COGST 501)
Fall. 4 credits. Concurrent or prior registration in COGST 101/COM S 101/ LING 170/PSYCH 102, Introduction to Cognitive Science, is required. Co-meets with PSYCH 614, Issues in Cognitive Psychology. S. Edelman.
This course introduces graduate students interested in cognition (especially those who plan to pursue the Cognitive Studies minor) to the central issues in computational cognitive psychology. It consists of a series of advanced-level discussions of selected examples from the material covered in COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102 and COGST 214/PSYCH 214/614 (perception, attention and consciousness, memory, thinking, and language). The course focuses on the development of skills required for critical evaluation of research in cognitive sciences, backed by an in-depth understanding of the relevant concepts and theories.

PSYCH 510–511 Perception

PSYCH 512–514 Visual Perception

PSYCH 518 Topics in Psycholinguistics

PSYCH 519–520 Cognition

PSYCH 521 Psychobiology (Developmental Seminar)

PSYCH 522 Topics in Perception and Cognition

PSYCH 523 Hormones and Behavior

PSYCH 527 Topics in Biopsychology

PSYCH 530 Representation of Structure in Vision and Language (also COGST 530 and LING 530)
Spring. 4 credits. Graduate seminar. Prerequisites: a course each in cognitive psychology, linguistics, computer science, or permission of instructor. Enrollment limited to 13 graduate students.
S. Edelman.
The seminar concentrates on the nature of the representation of visual objects and scenes in the brain and compare it with the structural framework that serves as the main explanatory tool in current theories of language processing. Data and ideas are drawn from visual psychophysics, neurophysiology, psycholinguistics, computational vision and linguistics, and philosophy. Students present published research papers and preprints, which are then discussed and critiqued.

PSYCH 531 Topics in Cognitive Studies (also COGST 531 and LING 531)
Spring. 4 credits. M 4:15–6:15. Staff.
This seminar series takes advantage of the wide range of expertise and research interests of the faculty members of the Cognitive Studies Program. Every time it is offered, the seminar concentrates on a cluster of issues that span disciplines from Neurobiology and Behavior, through Psychology and Linguistics, to Computer Science and Philosophy. Each meeting consists of a short background presentation, followed by a seminar-style discussion of a chosen issue, exemplified by a current research publication. Students will submit weekly essays discussing the assigned publications, and a term paper integrating the various topics covered.

PSYCH 535 Evolutionary Perspectives on Behavior

PSYCH 541 Statistics in Current Psychological Research

PSYCH 550 Special Topics in Cognitive Science

PSYCH 580 Experimental Social Psychology

PSYCH 600 General Research Seminar
Fall or spring. No credit.

[PSYCH 601 Computational Models of Language
Spring. 4 credits. Prerequisites: consent of instructor. R 10:10–12:05. Not offered 2001–2002. M. Spivey.
This seminar involves in-depth discussion of a range of computational approaches to language representation, processing, and acquisition. We cover pharse-structure grammars, context-free grammars, connectionist models, statistical natural language processing, and dynamical systems, to name just a few. There is also some hands-on experience writing models in a computer lab using the MATLAB programming environment.]

PSYCH 605 Perception (also PSYCH 205)
Spring. 4 credits. Non-arts graduate students only. T R 11:40–12:55.
J. E. Cutting.

[PSYCH 607 Chemosensory Perception (also PSYCH 307)
Fall. 4 credits. T R 9:05. Not offered 2001–2002. B. P. Halpern.]

[PSYCH 611 Introduction to Human Memory (also PSYCH 311)
Spring. 4 credits. T R 11:40–12:55. Not offered 2001–2002. Staff.]

[PSYCH 612 Laboratory in Cognition and Perception (also PSYCH 412)
Spring. 4 credits. M W 2:55–4:10. Not offered 2001–2002. D. J. Field.]

PSYCH 613 Obesity and the Regulation of Body Weight (also NS 315)
Spring. 3 credits. Limited to 30 students. Prerequisites: 1 course in psychology and 1 course in nutrition. Undergraduate students may register with permission of instructor. S-U grades optional. Offered alternate years. T R 1:25–3:20.
D. A. Levitsky.
This course is a multidisciplinary discussion of the causes, effects, and treatments of human obesity. Topics include the biopsychology of eating behavior, the genetics of obesity, the role of activity and energy metabolism, psychosocial determinants of obesity, anorexia nervosa, therapy and its effectiveness, and social discrimination.

PSYCH 614 Issues in Cognitive Psychology (also PSYCH 214)
Fall. 4 credits. M W F 10:10. S. Edelman.

[PSYCH 615 Concepts, Categories, and Word Meaning (also PSYCH 415)
Fall. 4 credits. M 1:25–4:25. Not offered 2001–2002. Staff.]

PSYCH 616 Modeling Perception and Cognition (also PSYCH 416 and COGST 416)
Spring. 4 credits.

[PSYCH 618 Psychology of Music (also PSYCH 418)
Spring. 4 credits. M W 2:55–4:10. Not offered 2001–2002. C. Krumhansl.]

[PSYCH 619 Neural Networks Laboratory (also PSYCH 419)
Spring. 4 credits. T R 2:55–4:10. Not offered 2001–2002. D. J. Field.]

[PSYCH 622 Developmental Biopsychology (also PSYCH 422)
Fall. 4 credits. M W F 9:05–9:55. Not offered 2001–2002. B. L. Finlay.]

PSYCH 625 Cognitive Neuroscience (also PSYCH 425)
Fall. 4 credits. M W F 9:05–9:55. B. L. Finlay.

PSYCH 626 Evolution of Human Behavior (also PSYCH 326)
Fall. 4 credits. T R 2:55–4:10. R. E. Johnston.

[PSYCH 629 Olfaction and Taste: Structure and Function (also PSYCH 429 and BIONB 429)
Spring. 4 credits. T R 9:05. Not offered 2001–2002. B. P. Halpern.]

[PSYCH 631 Effects of Aging on Sensory and Perceptual Systems (also PSYCH 431 and BIONB 421)
Fall. 4 credits. T R 10:10–11:25. Not offered 2001–2002. B. P. Halpern.]

PSYCH 632 Biopsychology of Learning and Memory (also PSYCH 332 and BIONB 328)
Spring. 4 credits. M W F 11:15. T. J. DeVoogd.

PSYCH 640 The Brain and Sleep (also PSYCH 440)
Fall. 4 credits. M W 2:55–4:10. H. S. Porte.

PSYCH 641 Laboratory in Sleep Research (also PSYCH 441)
Spring. 4 credits. W 7:30–10:30. H. S. Porte.

PSYCH 642 Human Perception: Applications to Computer Graphics, Art, and Visual Display (also PSYCH 342 and COGST 342)
T R 11:40–12:55. D. J. Field.

PSYCH 650 The Lenses of Gender (also PSYCH 450 and WOMNS 450 and 650)
Fall. 4 credits. F 2:30–4:25. S. L. Bem.

PSYCH 665 Topics in High-Level Vision (also PSYCH 465, COGST 465, and COM S 392)
Spring. 4 credits. S. Edelman.

PSYCH 681 Advanced Social Psychology (also PSYCH 481)
Fall. 4 credits. T R 10:10–11:25. D. T. Regan.

PSYCH 689 Seminar: Beliefs, Attitudes, and Ideologies (also PSYCH 489)
Fall. 4 credits. M 2:30–4:25. D. J. Bem.

[PSYCH 691 Research Methods in Psychology (also PSYCH 491)
Spring. 4 credits. T R 10:10–11:25. Not offered 2001–2002. D. A. Dunning.]

PSYCH 692 Sensory Function (also PSYCH 492 and BIONB 492)
Spring. 4 credits. M W F 10:10. B. P. Halpern and H. C. Howland.

[PSYCH 696 Introduction to Sensory Systems (also PSYCH 396 and BIONB 396)
Spring. 4 credits. M W F 10:10. Not offered spring 2002. B. P. Halpern.]

PSYCH 700 Research in Biopsychology

PSYCH 709 Developmental Psychology (also PSYCH 209)
Spring. 4 credits. M W 2:55–4:10. S. Johnson.

PSYCH 710 Research in Human Experimental Psychology

PSYCH 713 Information Processing: Conscious and Nonconscious (also PSYCH 413)
Spring. 4 credits. R 10:10–12:35. Staff.

PSYCH 714 Comparative Cognition (also PSYCH 414 and COGST 414)
Spring. 4 credits. T R 11:40–12:55. M. J. Owren.

PSYCH 716 Auditory Perception (also PSYCH 316)
Fall. 4 credits. M W 2:55–4:10. C. L. Krumhansl.

PSYCH 717 The Origins of Thought and Knowledge (also PSYCH 417)
Fall. 4 credits. M W 2:55–4:10. S. Johnson.

PSYCH 720 Research in Social Psychology and Personality

PSYCH 722 Hormones and Behavior (also PSYCH 322 and BIONB 322)
Fall. 4 credits. M W F 11:15–12:05. E. A. Regan.

[PSYCH 773–774 Proseminar in Cognitive Studies I and II (also COGST 773/774, PHIL 773/774, LING 773/774, and COMS 773/774)
Fall: R grade. Spring: S-U only. 4 credits. Not offered 2001–2002.
The Cognitive Studies Proseminar consists of two semesters of meetings with the graduate faculty in the field of Cognitive Studies. The proseminar consists of a general introduction to the field of Cognitive Studies including an introduction to each of the major disciplines that make up the minor: i.e., computer science, linguistics, philosophy, and psychology. In each of these disciplines, faculty members from the field introduce the theoretical and methodological issues that underlie the field and its relation to Cognitive Studies; in addition, they introduce various labs in which active research is being conducted in their field at Cornell.

The proseminar includes suggestions from faculty in each field for further advanced interdisciplinary research that can be pursued at Cornell during a Cognitive Studies minor. It concludes (end of second term) with individual student presentations in which students initiate a critique of some interdisciplinary research, after consultation with a faculty member of their choice.

Although suitable to entering graduate students, the proseminar is also open to graduate students beyond their first year. Advanced undergraduates with a Cognitive Studies concentration may also be admitted. This is a year-long lecture and discussion course. The year-long commitment is mandatory. An "R" grade is assigned in the fall semester, and a S-U grade only is assigned in the spring semester.]

PSYCH 775 Proseminar in Social Psychology (I)
Fall. 2 credits. Limited to 10 graduate students in social psychology. Prerequisite: permission of instructors. Hours TBA. D. A. Dunning, T. D. Gilovich, and D. T. Regan.
This is the first term of a year-long discussion-seminar course intended to give graduate students an in-depth understanding of current research and theory in social psychology. The course will emphasizes social cognition, but other topics, such as group dynamics, social influence, the social psychology of language, and emotional experience, etc., are covered.

PSYCH 776 Proseminar in Social Psychology (II)
Spring. 2 credits. Limited to 10 graduate students in social psychology. Prerequisite: permission of instructors. Hours TBA. D. A. Dunning, T. D. Gilovich, and D. T. Regan.
This is the second half of a year-long discussion-seminar course intended to give graduate students an in-depth understanding of current research and theory in social psychology. The course emphasizes social cognition, but other topics, such as group dynamics, social influence, the social psychology of language, and emotional experience are covered.

PSYCH 900 Doctoral Thesis Research in Biopsychology

PSYCH 910 Doctoral Thesis Research in Human Experimental Psychology

PSYCH 920 Doctoral Thesis Research in Social Psychology and Personality

Summer Session Courses

The following courses are also frequently offered in the summer session, though not necessarily by the same instructor as during the academic year. Not all of these courses are offered in a particular summer. Information regarding these courses and additional summer session offerings in psychology is available from the department before the end of the fall semester.

PSYCH 101 Introduction to Psychology: The Frontiers of Psychological Inquiry

PSYCH 102 Introduction to Cognitive Science

PSYCH 128 Introduction to Psychology: Personality and Social Behavior

PSYCH 199 Sports Psychology

PSYCH 223 Introduction to Biopsychology

PSYCH 280 Introduction to Social Psychology

PSYCH 350 Statistics and Research Design

QUECHUA

See Romance Studies.

RELIGIOUS STUDIES MAJOR

See "Special Programs and Interdisciplinary Studies."

ROMANCE STUDIES

The Department of Romance Studies (Mitchell Greenberg, chair) offers courses in the following areas: French, Italian, and Spanish literature; French, Italian, Portuguese, Quechua, and Spanish language; Francophone, Italian, and Hispanic culture; and linguistics and semiotics. Through its course offerings and opportunities for independent study, the department seeks to encourage study of the interactions of the Romance literatures among themselves, with other literatures, and with other fields of inquiry.

French

J. Béreaud (director of undergraduate studies), A. Berger, N. Furman, A. Grandjean-Levy, M. Greenberg (chair), R. Klein, P. Lewis, S. LoBello, K. Long, T. McNulty, J. Ngaté, D. Posner (visiting), K. Proux, D. Rubenstein (visiting), C. Sparfel, S. Tun, M. C. Vallois, C. Waldron. Emeriti: A. Colby-Hall, D. I. Grossvogel, A. Seznec. Adjunct Associate Professor: S. Tarrow

The Major

The major in French is divided into two options: French Area Studies and French literature. While prospective majors should try to plan their programs as far ahead as possible, especially if they intend to study abroad, no student will be refused admission merely because of a late start. In view of the ongoing curriculum changes that will be implemented in 2001–2002, please see Professor Jacques Béreaud, jb73@cornell.edu, the Director of Undergraduate Studies, in 308 Morrill Hall. This consultation is especially important for finding out what sequence of courses will follow the current choice of courses.

Students interested in majoring in French liniguistics should contact the Department of Linguistics.

Honors. The honors program encourages well-qualified students majoring in French linguistics to do independent work in French outside the structure of courses. The preparation of the senior honors essay, generally spread over two terms, provides a unique learning opportunity, since it allows for wide reading and extensive rewriting to a degree not practically possible in the case of course papers.

No special seminars or courses are required of honors students, but they have regular meetings with faculty advisers who have agreed to supervise their work. They may receive course credit by enrolling in FRROM 429–430, but these independent study courses must be taken in addition to the courses that meet the minimum requirements for the major. At the end of the senior year each honors student is examined orally on the honors essay by a jury consisting of his or her faculty adviser and two other faculty members. The awarding of honors is determined by the student's grades in the major and the quality of the honors essay.

The Literature Option

The major in French, Literature Option, is designed to give students proficiency in the oral and written language, to acquaint them with French literature and culture, and to develop skills in literary analysis.

Admission

To be admitted to the major, students should have completed FRLIT 201, 220, or 221 plus 222 and FRROM 219 (formerly 213) or its equivalent by the end of their sophomore year.

For completion of the major, a student must:

1) acquire a sound degree of competence in French language. This competence is demonstrated by the successful completion of FRROM 301–312 or their equivalents, such as properly accredited study abroad or the passing of a special language test (the CASE examination) or the permission of the adviser (this option applies only to 312).
2) take six courses in French literature or civilization at the 300 level or above. These courses, selected in consultation with the student's major adviser, will include at least two pre-19th-century courses and at least one 400-level course.
3) take two connected courses in one of the following related areas: literature, linguistics, comparative literature, history, history of art, visual studies, music, government, or another relevant discipline with a significant French component. Students who are double majors are exempted from this last requirement.

The French Area Studies Option

Admission

To be admitted to the major, students should have completed FRLIT 201, 220, 221, or 224 plus 219 (formerly 213) or its equivalent by the end of their sophomore year.

For completion of the major, a student must:

1) acquire a sound degree of competence in the French language. This competence is demonstrated by the successful completion of FRROM 301–312 or their equivalents, such as properly accredited study abroad or the passing of a special language test (the CASE examination) or the permission of the adviser (this option applies only to 312).
2) take two courses in Romance Studies (literature or civilization) at the 300 level or above.
3) take six courses at the 300 level or above in no more than three areas of interest such as—but not limited to—Africana studies, anthropology, comparative literature, French literature, economics, government, history, history of art, linguistics, music, theater arts, women's studies, and visual studies. Each area must be represented by at least two courses, and each course must have a significant French component. At least one of these six courses should be at the 400 level.

Administration of French Area Studies

Students are admitted to the major by the director of undergraduate studies in the French section of the Department of Romance Studies but are guided by their individual advisers. A copy of each student's program is given to the director of undergraduate studies for approval and safe-keeping.

Study Abroad in France

French majors or other interested students may study in France for one or two semesters during their junior year. Opting for one of several study-abroad plans recognized by the Departments of Romance Studies and Linguistics facilitates the transfer of credit. Information about these plans is available from the director of undergraduate studies.

Students must be Cornell undergraduates with a strong academic record. The minimum French preparation is the completion of FRROM 219 (formerly 213) or its equivalent in advanced credit or placement by the Cornell CASE examination. The taking of FRROM 301 and/or 312 is, however, strongly recommended.

Students interested in studying in France are encouraged to consider the special benefits offered by EDUCO, the program in Paris cosponsored by Cornell and by Emory-Duke University. EDUCO offers advanced students a challenging course of study and the experience of total immersion in French life and culture in Paris. Participants in this program spend the year or semester as fully matriculated students at the University of Paris VII and other institutions of higher learning in Paris, including the Institut d'Etudes Politiques (Sciences Po), selecting courses in many fields from the regular university course offerings. Students begin the academic year with an intensive three-week orientation in French history, society and daily life. While it is possible to enroll in the EDUCO Program for one semester, admission will be given first to students planning to study abroad for the full academic year.

EDUCO maintains a center in Paris with appropriate support staff. The resident director, chosen annually from the Cornell and Duke faculties, teaches a special seminar each semester, provides academic advice, and helps ensure the quality of the courses. The center, which includes a small library and word-processing facilities, is regularly used by students for special tutorials, seminars, and lectures, as well as informal gatherings.

Honors. The honors program encourages well-qualified students majoring in French literature and culture to do independent work in French outside the structure of courses. The preparation of the senior honors essay, generally spread over two terms, provides a unique learning opportunity, since it allows for wide reading and extensive rewriting to a degree not possible in the case of course papers.

To be eligible for Honors, students must have a general grade point average of at least 3.00 and a grade point average of at least 3.5 in their French major.

No special seminars or courses are required of honors students, but they will have regular meetings with the faculty advisers who have agreed to supervise their work. They may receive course credit by enrolling in French 429–430, but these independent study courses must be taken in addition to the courses that meet the minimum requirements for the major. At the end of the senior year, each honors student is examined orally on the honors essay by a jury consisting of his or her faculty adviser and two other faculty members. The senior essay is to be made available for reading by the jury on or before April 15. The awarding of honors is determined by the student's grades in the major and the quality of the honors essay.

Language

Enrollment in a language course is conditional upon the student's eligibility for the particular level and on attendance of the first scheduled class session. Further, a student who fails to attend the first three days of class will be automatically dropped from the course in order to accommodate those on the waiting lists.

All French language courses are offered by the Department of Romance Studies and French linguistics courses are offered by the Department of Linguistics.

Note: *Students placed in the 200-level courses have the option of taking language and/or literature courses; see listings under "Literature" for descriptions of the literature courses, some of which may be taken concurrently with FRROM 206, 209, or 219 or H ADM 266.*

FRROM 112 Elementary French: Review and Continuation
Fall. 4 credits. Prerequisite: LPF score 37–44. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. S. Tun and staff.
This course is designed for students who have taken some French and who have a placement score of 37–44 or SAT II 410–480. It provides a basic review and then moves on to cover new material for the remainder of the term. Students who have taken FRROM 121 may enroll for this course. As part of the final exam, students take the LPF and, according to their score, may place into FRROM 123 (score below 56) or receive qualification (56 or above), and placement into the 200-level courses.

FRROM 121–122 Elementary French
121, fall; 122, spring. 4 credits each term. Prerequisite: FRROM 122, FRROM 121. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. C. Sparfel and staff.
This course is intended for students with no experience in French. (To be eligible for FRROM 121, students who have previously studied two or more years of French must have an LPF score lower than 37 or SAT II lower than 370).

The goal of FRROM 121–122 is to provide a thorough grounding in the language and insights into French language and francophone cultures so that students can function in basic situations in a French-speaking culture. Small classes provide intensive, context-specific practice in speaking, reading, writing, and listening comprehension.

FRROM 123 Continuing French
Fall or spring. 4 credits. ***Provides language qualification.*** Prerequisite: LPF score 45–55 or SAT II 490–590. Satisfactory completion of FRROM 123 fulfills the qualification portion of the language requirement. Recommended courses after FRROM 123: FRROM 206 or 209. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. Fall: C. Waldron and staff; spring: S. Tun and C. Waldron.
FRROM 123 is an all-skills course designed to improve pronunciation, oral communication, and reading ability; to establish a groundwork for correct writing; and to provide a substantial grammar review. The approach in the course encourages the student to see the language within the context of its culture.

FRROM 206 Intermediate Reading and Writing (formerly FRROM 200)
Fall or spring. 3 credits. ***Provides language proficiency.*** Prerequisite: qualification in French (FRROM 123, LPF score 56–64, or SAT II 600–680). Satisfactory completion of FRROM 206 fulfills the proficiency portion of the language requirement. Conducted in French. Recommended courses after FRROM 206: FRROM 219 (formerly FRROM 213), FRROM 220 or FRROM 221. FRROM 219 (formerly FRROM 213) may be taken concurrently with FRROM 220. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. Fall: S. LoBello; spring: C. Sparfel.
This language course is designed for students who want to focus on their reading and writing skills. Emphasis is placed on grammar review and expansion, vocabulary development, and appreciation of different styles of language. Diverse text types are used, including a contemporary novel and student-selected material.

FRROM 209 Intermediate Composition and Conversation I (formerly FRROM 203)
Fall, spring, or summer. 3 credits. ***Provides language proficiency.*** Prerequisite: qualification in French (FRROM 123, LPF score 56–64, or SAT II 600–680). Satisfactory completion of FRROM 209 (formerly FRROM 203) fulfills the proficiency portion of the language requirement. Recommended courses after FRROM 209: FRROM 219 (formerly FRROM 213), FRROM 220 or FRROM 221. FRROM 219 (formerly FRROM 213) may be taken concurrently with either FRROM 220 or FRROM 221. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. A. Grandjean-Levy, K. Proux and staff; summer: staff.
Listening comprehension and speaking activities are aimed at improving oral communication. Includes compositions, and cultural and literary readings. This course gives students the opportunity to strengthen their knowledge of grammar for increased mastery.

FRROM 219 Intermediate Composition and Conversation II (formerly FRROM 213)
Fall or spring. 3 credits. Prerequisite: proficiency in French (FRROM 206 or 209), or permission of instructor, or placement by Cornell Advanced Standing Examination (CASE). For admission to the Cornell Abroad Program, students are required to take either this course, or have completed an equivalent level of study. Taught in French. Recommended courses after FRROM 219: FRROM 220, 221, 301, or 305 (220 or 221 may be taken concurrently with 301 or 305). Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. Fall: A. Grandjean-Levy, S. LoBello, and K. Proux; spring: S. LoBello and K. Proux.
Emphasis is on improving grammatical accuracy and on enriching vocabulary in oral and written expression of French. Varied types of reading including newspaper articles, short videos, films, and presentations by students, provide the basis for writing assignments and class discussions. Themes and emphases may vary from section to section.

FRROM 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. Staff.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

FRROM 301 Advanced French (I)
Fall or spring. 4 credits. Prerequisite: FRROM 219 (formerly FRROM 213), or Q++ on the Cornell Advanced Standing Examination (CASE). Recommended courses after FRROM 301: FRROM 312. FRROM 220, or FRROM 221 may be taken concurrently with 301. Fall: J. Béreaud and staff; spring: S. LoBello and staff.
Class discussions based on reading contemporary texts: half short stories, half articles on current events taken from French magazines or newspapers. All texts are chosen for thematic or cultural interest and linguistic quality. Special attention is given to accuracy in French through grammar review and weekly papers (essays or translations). Each student gives one or more oral presentations in class. Course required of French majors.

FRROM 305 French through Film
Fall or spring. 4 credits. Prerequisite: FRROM 219 (formerly FRROM 203), or Q++ on the Cornell Advanced Standing Examination (CASE). Recommended courses after FRROM 305: FRROM 301, 312 (with the permission of the instructor), 220, or 221. FRROM 220 or 221 may also be taken concurrently with FRROM 305. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. C. Waldron.
Analysis of French contemporary films and related readings. Used as a means of studying the language. Particular emphasis is on the culture and historical context as it relates to French contemporary society. Additionally, guest speakers provide enrichment on selected topics.

FRROM 312 Advanced French (II)
Fall or spring. 4 credits. Limited to 15 students. Prerequisite: FRROM 301 or with permission of instructor, or placement by the Cornell Advanced Standing Examination (CASE). Fall: M. C. Vallois and staff; spring: N. Furman.
Continuation of work done in FRROM 301. The objective of FRROM 301 is to teach students to speak and write correct French; in FRROM 312 students are expected to have a richer, more idiomatic and hopefully elegant command of the language.

Formal study of grammar is discontinued, and more attention is devoted to the examination of the stylistics and rhetorical characteristics of texts and to oral presentations by students. Weekly papers as in FRROM 301.

FRROM 313 French in the News
Spring. 4 credits. Prerequisite: FRROM 301, or FRROM 305, or placement by the Cornell Advanced Standing Examination (CASE). A. Grandjean-Levy.
Studying French televised news broadcasts and other media, places students at the heart of today's France. Flexible approach allows students to perfect their language skills.

FRROM 630 French for Reading—Graduate Students
Spring only. 3 credits. Limited to graduate students. C. Sparfel and staff.

Designed for those with little or no background in French, this course's primary aim is to develop skill in reading French. Grammar basics, extensive vocabulary, and strategies for reading in a foreign language are covered. Some flexibility in selecting texts according to fields of interest is offered.

Literature

FRLIT 201 Introduction to Techniques of Reading French Literature

Fall. 3 credits. *Provides language proficiency.* Prerequisites: qualification in French (SAT II score of 600–680, LPF score of 56–64, or French 123). Students with an SAT II score of 640 or an LPF score of 60 or more, should take French 221. Recommended courses after FRLIT 201: French 219, 220, or 221, or permission of instructor. Conducted in French. M. C. Vallois and staff.

FRLIT 201 is designed for students interested in improving their written and oral skills in French and also their literary proficiency. Texts have been chosen both for their literary merit and their manageable linguistic difficulty. Close scrutiny of the works and active class discussions will sharpen students' critical and analytical abilities. The reading list may include authors such as Baudelaire, Hugo, Ionesco, Camus, Rimbaud, Sartre, and Duras.

FRLIT 220 French and Francophone Culture @ (IV)

Spring. 3 credits. Prerequisite: SAT II score of 640 and above, or LPF score of 60 or FRROM 206 (formerly FRROM 200) or 209 (formerly FRROM 203). Conducted in French. M-C. Vallois and staff.

This course serves as an introduction to French Area Studies. It provides an overview of Francophone culture and society from 1945 to the present. Readings include a selection of articles dealing with issues of current concern in France; works by French and Maghrebi or African writers; poetry or drama; two films are also discussed.

FRLIT 221 Modern French Literature # (IV)

Fall or spring. 3 credits. Prerequisites: SAT II score of 640 and above, or LPF score of 60, or FRLIT 206 (formerly FRROM 200) or 209 (formerly FRROM 203). Conducted in French. Fall: M. C. Vallois and staff; spring: J. Bëreaud, T. McNulty and staff.

This course, divided into small sections, is intended as an introduction to French literature of the modern period. Texts are chosen because of their centrality to the traditional literary canon and with an eye to experimentation. The course considers literary genres (poetry, drama, the novel) as solicitations to read texts differently, at different speeds, with diverse claims on our attention. One test may include French script. The course is designed to satisfy a general interest in modern French literature as well as to prepare students to pursue a French major in literature. Readings include works by Baudelaire, Mallarmé, Beckett, Camus, Proust, Duras, and Assia Djebar.

FRLIT 222 Early Modern French Literature # (IV)

Spring. 3 credits. Prerequisite: FRLIT 220, 221, or permission of the instructor. Conducted in French. M. C. Vallois.

Study of the classic literature of seventeenth-century France (Corneille, Racine, Molière, Mme de Lafayette, La Fontaine) and of eighteenth-century Enlightenment literature (Voltaire, Rousseau, Diderot, Beaumarchais). Special attention is paid to the ways in which these various works represent or deal with the shift from an aristocratic cultural code of values to modern bourgeois ideology and aesthetics. The course also invites reflection on the status and centrality of female characters in classical and neo-classical French literature. Theater being central to this period, the course gives special attention to major plays of the classical period. It traces the evolution from the classical tragic heroine to more modern (but no less problematic) representations of women.

FRLIT 224 The French Experience (also ANTHR 224) (III or IV)

Fall. 3 credits. Conducted in English. Readings available both in French and in English translation. A. Berger and J. Siegel.

We look ethnographically and through literature at tastes and at class as they function and are discussed in France. We examine speech in its practice and as it is reflected upon; and we look at views from France, from America, and other countries. As we emphasize differences, the French experience emerges.

Note: Prerequisite for all 300-level courses in French literature: FRLIT 220, 221 or the equivalent.

FRLIT 320 Civilization II: Contemporary France (IV)

Fall. 4 credits. Prerequisite: FRROM 219 (formerly FRROM 213) or equivalent. Conducted in French. J. Bëreaud.

Detailed, analytical study of contemporary French society, its structure and its culture. In the second part of the course, students select a topic for in-depth, personal research leading to the writing of a term paper. Short oral presentations are encouraged. A variety of resources are used: texts, magazine and television excerpts, internet items. A few films are shown to illustrate some aspects of French life.

FRLIT 324 Imagining America: French Travel Writing from de Tocqueville to Baudrillard (IV)

Fall. 4 credits. D. Rubenstein.

This course addresses nineteenth and twentieth-century French travel writing about America from Alexis de Tocqueville's landmark work. De la Démocratie en Amérique to Jean Baudrillard's polemical Amérique. We will be concerned with the question of what America, as both "utopian" ideal and as a living example, represents for the French philosophical voyager. For example, what role does national fantasy play in the encounters revealed in Julia Kristeva's excursion to American universities in Les Samourais or in Simone de Beauvior's guided (by Richard Wright) tour as recounted in her diary L'Amérique au jour le jour. We will also discuss Francois-René de Chateaubriand's René as a literary limit case of inter-cultural exchange. The course will be conducted in English, and non-French majors will be able to read the books in English translation.

FRLIT 326 May '68 and Its Consequences (IV)

Spring. 4 credits. Conducted in French. J. Bëreaud.

The course first studies the students' revolt of May 1968 in France, placing it in its national and international political and ideological context. It then traces the changes brought about by the spirit of May '68 in some areas of French society, especially youth and education. Finally, it leads to a reflection on current ideologies and the change from modernism to post-modernism.

FRLIT 330 Francophone African Literature @ (IV)

Spring. 4 credits. Conducted in French. D. Posner.

Introduction to the works of representative poets, dramatists, novelists, and short story writers from sub-Saharan Africa and Madagascar. L. S. Senghor, C. Laye, F. Oyono, J. J. Rabëarivelo, S. Labou Tansi, and the Afro-Caribbean Aimé Césaire are among the writers whose works are read. The focus is on the twentieth century and the nature of these writers' relationships with both the West and with Africa.

FRLIT 333 Contemporary French Thought (IV)

Spring. 4 credits. Conducted in French. D. Rubenstein.

This course will survey the major contemporary post structuralist, psychoanalytic, and deconstructive theorists in French thought today: Lacan, Foucault, Derrida, Barthes, Bourdieu, Baudrillard and Wittig. Particular emphasis will be on the contribution of these theorists to the analysis of sexuality and pedogogy.

FRLIT 334 The Novel as Masterwork (also FRLIT 684) # (IV)

Spring. 4 credits. Conducted in French. Prerequisite: FRLIT 221 or permission of the instructor. N. Furman.

This course traces the evolution of the nineteenth-century French novel. Readings include novels by Stendhal, Balzac, Flaubert, and Zola.

FRLIT 335 Romance to Revolution: The French Novel before 1789 # (IV)

Spring. 4 credits. Prerequisite: FRLIT 221 or permission of instructor. Conducted in French. M. C. Vallois.

In addition to considering formal questions relating to the development of the novel in French, this course examines problems such as the appearance of narrative and historical consciousness, the representation of women, and the relation between literature and society. Texts read include major such works as Tristan and Iseult, Perrault's Contes, Mme de LaFayette, Prévost, Rousseau, Diderot, Laclos, and Sade.

FRLIT 370 Perspectives on the Age of Enlightenment: "Enlightened" Literatures # (IV)

Fall. 4 credits. M. C. Vallois.

Through a reading of various works of the French 18th century (by Montesquieu, Voltaire, Diderot, Rousseau, and Sade), we study the emergence of new literary discourses and practices aiming at a "secularization" of the literary field, in conjunction with the ideological and epistemological changes which took place under the name of Enlightenment.

FRLIT 386 Jewelry, Perfume, and Cigarettes in French Literature (IV)

Fall. 4 credits. R. Klein.

This course considers representations of adornment and other useless artifacts in French literature. Readings include works by Mérimée, Diderot, Baudelaire, Gautier, Colette, Mauriac, and Patrick Süsskind.

FRLIT 393 The 20th Century Novel (IV)
Spring. 4 credits. Prerequisite: FRLIT 221 or permission of the instructor. T. McNulty.
This course examines some of the major experiments with the novel form in twentieth century France (including surrealism, automatic writing, the *nouveau roman*, and *écriture féminine*), considering how authors adapt the form and structure of the novel to address such concerns as memory and forgetting, the creative agency of the unconscious, gender and sexuality, exile and displacement, technology and mass reproduction. Authors studied include Gide, Proust, Breton, Roussel, Malraux, Duras, Robbe-Grillet, and Sarraute.

FRLIT 406 Biblical Diaspora's in France (also S HUM 406 and COM L 488) (IV)
Fall. 4 credits. T. McNulty.
This course examines the use of the concept of "diaspora" in contemporary French thought. We focus our attention on a group of authors whose uses and adaptations of the concept of "diaspora" are heavily indebted to theologies such as Judaism and mysticism. Can we locate in modern philosophy the "diaspora" of a certain kind of theological thought? What is its relationship to the philosophical discourse in which it takes up residence? The first part of the course considers the problems of estrangement, nomadism, and diaspora in the Bible, examining how the Hebrew patriarchs, Jewish prophets, and Christian apostles use these themes to define their position with regard to God and their different attitudes toward the law, the word, and the book. We then explore how these themes are developed in works by Blanchot, Buber, Deleuze, Derrida, Levinas, Lyotard, Scholem and Rosenzweig. Students may read all works in the original languages or in translation.

FRLIT 413 History of Jews in Modern France (also HIST 417 and JWST 446) (III or IV)
Fall. 4 credits. Prerequisite: permission of instructor. V. Caron.
For description, see HIST 417.

FRLIT 419–420 Special Topics in French Literature
419, fall; 420, spring. 2–4 credits each term. Prerequisite: permission of instructor. Staff.
Guided independent study of special topics.

FRLIT 429–430 Honors Work in French
429, fall; 430, spring. 8 credits year-long course, R grade fall semester, letter grade spring semester, with permission of the adviser. Open to juniors and seniors. Consult the director of the honors program. M. C. Vallois and staff.

FRLIT 448 Medieval Literature # (IV)
Spring. 4 credits. Prerequisite: FRLIT 221 or permission of the instructor. Conducted in English. A. Colby-Hall.
FRLIT 448 deals with the romance and the lyric. Facility in reading Old French and appreciation of these two major genres are the primary goals of this course.

FRLIT 455 Rabelais (also FRLIT 655) # (IV)
Spring. 4 credits. Conducted in French. D. Posner.
Rabelais's novels, and their explorations of the limits of linguistic expression, are studied in the context of the popular culture of the Late Middle Ages and Early Renaissance, of the dawn of religious conflict in France, of the querelle des femmes (the intellectual debate over the status of women), and of early modern science. We also observe how Rabelais's texts situate themselves in problematic relation to the institutions of Church and State.

FRLIT 471 Translation for the Theatre (also THETR 423/623 and FRLIT 671) (IV)
Spring. 4 credits. Prerequisites: proficiency in language other than English; coursework in dramatic literature, directing, or playwriting. Conducted in English. J. E. Gainor.
For description, see THETR 423.

FRLIT 480 Nineteenth-Century French Women Writers (also WOMNS 478 and FRLIT 680) # (IV)
Fall. 4 credits. Conducted in French. A. Berger.
While situating the works read within their specific historical and literary context, this course attempts to address the following questions: How does the inscription of literature as a Public Institution within a phallocentric cultural order affect women authors' status and writing strategies? To what extent and at what levels does being a woman inform or shape the text produced? And, in what ways is literary writing concerned with sexual difference? Writers include Mme. de Staël, George Sand, Flora Tristan, Rachilde and others.

FRLIT 488 Baudelaire in Context (also FRLIT 688, COML 480/680) # (IV)
Spring. 4 credits. Prerequisite: one 300-level course in French literature or permission of instructor. Conducted in French. J. Culler.
A study of *Les Fleurs du mal* in the context of various nineteenth-and twentieth-century discourses: The Romantic lyric (Hugo, Lamartine, Desbordes-Valmore), Romantic Satanism, debates about prostitution, and twentieth-century accounts of Baudelaire as the founder of modern poetry or the poet of the city.

FRLIT 607–608 Proseminar
607, fall; 608, spring. 2 credits each term. M. Greenberg.
The pro-seminar is the place for sustained exchanges between graduate students, faculty, and visiting lecturers. Activities include reading and discussion of seminal texts, chapters from dissertations and works in-progress, and articles and essays from visiting lecturers.

FRLIT 639–640 Special Topics in French Literature
639, fall; 640, spring. 2–4 credits each term. Staff.
Guided independent study for graduate students.

FRLIT 655 Rabelais (also FRLIT 455)
Spring. 4 credits. Conducted in French. D. Posner.
For description, see FRLIT 455.

FRLIT 671 Translation for the Theatre (also THETR 423/623 and FRLIT 471)
Spring. 4 credits. Conducted in English. J. E. Gainor.
For description, see THETR 423.

FRLIT 680 Nineteenth-Century French Women Writers (also WOMNS 478 and FRLIT 480)
Fall. 4 credits. Conducted in French. A. Berger.
For description, see FRLIT 480.

FRLIT 684 The Novel as Masterwork (also FRLIT 334)
Spring. 4 credits. Conducted in French. N. Furman.
For description, see FRLIT 334

Italian

Faculty: M. Migiel (director of undergraduate studies), T. Alkire, K. Battig von Wittelsbach, T. Campbell, F. Cervesi-McCobb, S. Stewart-Steinberg, P. Swenson. Emeriti: A. Grossvogel

The Major

Students who wish to major in Italian should consult Professor Marilyn Migiel, mm55@cornell.edu, the Director of Undergraduate Studies, in Morrill Hall 311. She will assign the student a major adviser; the general plan and the details of the student's course of study will be worked out in consultation with the adviser. Italian majors are encouraged to take courses in related subjects such as history, art history, music, philosophy, anthropology, classics, linguistics, and other modern languages and literatures. While a major often occupies only the junior and senior years, it is wise for students to seek faculty advice about the major as early as possible.

Students who elect to major in Italian ordinarily should have completed ITALL 216 or 217 by the end of their sophomore year. Exemptions can be made on the basis of an examination. Students majoring in Italian are expected to become conversant with a fair portion of the masterworks of Italian literature, to acquaint themselves with the outlines of Italian literary history, and to develop some skill in literary analysis. To this end, students are expected to complete successfully 32 credits of Italian literature courses at the 300 level or higher, with papers written in Italian or English. Required courses for the Major are ITALL 303, 304, and a course on Dante. ITALA 402, History of the Italian Language, and 403, Linguistic Structure of Italian, may be counted toward the 32 credits required for the major (an introductory linguistics course is a prerequisite for ITALA 402 and 403).

Students majoring in Italian are also expected to acquire competence in the handling of the language. That competence may be demonstrated by passing an oral and written examination to be arranged by the adviser.

Italian majors are also required to complete successfully two courses in related fields (for example, Italian history, Italian art history, literary theory).

Italian majors may study in Italy, generally during their junior year, under any of those study-abroad plans organized by American universities that allow the transfer of grades and credit.

To be eligible, students must have completed the first two years of their curriculum requirements and be in good academic standing.

Language

Enrollment in a language course is conditional upon the student's eligibility for the particular level and on attendance of the first scheduled class session. Further, a student who fails to attend the first three days of class will be automatically dropped from the course in order to accommodate those on the waiting lists.

ITALA 121–122 Elementary Italian
121, fall; 122, spring. 4 credits each term. Prerequisite: for ITALA 122, ITALA 121 or equivalent. Intended for beginners or students placed by examination. At the end of ITALA 122, students who score 56 or higher on the LPI attain qualification and may enter the 200-level sequence; otherwise ITALA 123 is required for qualification. Evening prelims. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. Fall: P. Swenson, F. Cervesi-McCobb, S. Stewart-Steinberg, and staff; spring: P. Swenson, T. Alkire, F. Cervesa-McCobb, S. Stewart-Steinberg and staff.
A thorough grounding in all the language skills: listening, speaking, reading, and writing. Language practice in small groups. Lectures cover grammar and cultural information.

ITALA 123 Continuing Italian
Fall or spring. 4 credits. ***Provides language qualification.*** Limited to students who have previously studied Italian and have an LPI score of 45–55 or an SAT II score of 460–580. Satisfactory completion of ITALA 123 fulfills the qualification portion of the language requirement. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. T. Alkire.
ITALA 123 is an all-skills course designed to improve speaking and reading ability, to establish a groundwork for correct writing, and to provide a substantial grammar review.

ITALA 209 Intermediate Composition and Conversation I (formerly ITALA 203)
Fall or spring. 3 credits. ***Provides language proficiency.*** Prerequisite: qualification in Italian. Students wishing to major in Italian are strongly encouraged to enroll concurrently in ITALL 214, 215, 216, or 217. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. Fall: K. Bättig von Wittelsbach or T. Alkire; spring: K. Bättig von Wittelsbach.
Guided conversation, composition, reading, pronunciation, and grammar review emphasizing the development of accurate and idiomatic expression in the language.

ITALA 219 Intermediate Composition and Conversation II (formerly ITALA 204)
Spring. 3 credits. Prerequisite: ITALA 209 (formerly ITALA 203) or equivalent. Students wishing to major in Italian are strongly encouraged to enroll concurrently in ITALL 214, 215, 216, or 217. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. K. Bättig von Wittelsbach.
Guided conversation, composition, reading, pronunciation, and grammar review emphasizing the development of accurate and idiomatic expression in the language.

Note: *Students placed in 200-level courses also have the option of taking courses in introductory literature, cultural studies, and cinema; see separate listings under ITALL 214, 215, 216 and 217 for descriptions of these courses.*

ITALA 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. Staff.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

Literature

ITALL 214 World News, Italian Views (IV)
Fall. 4 credits. Course limited to 18 students. Prerequisite: ITALA 209 (formerly ITALA 203) or permission of instructor. Conducted in Italian. M. Migiel.
In this seminar, we read, discuss, and write about a variety of global and transnational issues that get debated in the Italian media. Our approach to these cultural issues is grounded in rhetorical and discourse analysis. Students are required to read articles from Italian and English (both U. S. and British) sources. Students who read other languages (e.g. French, Spanish, etc.) are encouraged to offer points of comparison. Topics include: current events; international politics; developments in science and technology; economic and business ventures; literary bestsellers; movies; sports.

ITALL 215 The Cinematic Eye of Italy (IV)
Spring. 4 credits. Conducted in Italian. Prerequisite: ITALA 209 (formerly ITALA 203) or permission of the instructor. S. Stewart-Steinberg.
In this sophomore seminar, film is used to explore some of the most important issues in modern Italian cultural history, such as: Italy as a relatively new nation-state; fascism; regionalism; the Southern question; Catholicism; terrorism; the new consumerism of the 80's and 90's; and Italy's recent evolution into a multicultural society. Films viewed include those from the fascist era and the neorealist period, as well as later reformulation and critiques of these early works. There are also readings designed to introduce students to Italian film criticism and to key debates about contemporary Italian culture.

ITALL 216–217 Introduction to Italian Literature (IV)
Fall: 216; spring: 217. 3 credits. Prerequisite: permission of instructor. ITALL 216 is not prerequisite to ITALL 217. Conducted in Italian. Fall, F. Cervesi-McCobb; spring, T. Campbell.
In this course, students develop their language skills in Italian by reading, discussing, and writing about short works of fiction (twentieth-century short stories in ITALL 216; twentieth-century prose works in ITALL 217).

Italian Culture Courses

The sequence of ITALL 220, 221, 222, 223, and 224 is intended to give students a broad overview of the principal issues in Italian culture. The approach is interdisciplinary, drawing on materials from at least three of the following cultural domains: literature, politics, economics, history, art, film, music, religion, science, psychology, philosophy, anthropology.
ITALL 220–224 are conducted in English. Students who are proficient in Italian have the option of enrolling concurrently in the one-credit Italian Practicum, ITALL 300.

ITALL 220 Medieval Italy # (IV)
Spring. 4 credits. Prerequisite: permission of instructor. Conducted in English. M. Migiel.
Introduction to 13th-and 14th-century Italy, with particular attention to the cultural, socio-economic, and political forms that provided the basis for the Italian Renaissance. Units of study are devoted to: changing notions of the individual, politics, and morality; the impact of the new mercantile economy and culture; gender relations; the family; mysticism and popular religious movements; relation to non-Western cultures; the rise of Italian literature in the vernacular; and the impact of the Black Death (1348).

ITALL 224 Contemporary Italy (IV)
Fall. 4 credits. Prerequisite: permission of instructor. Conducted in English. T. Campbell.
Intended as an Italian cultural studies primer. We examine Italy from the period immediately following World War II to the present day. Topics for study include: neorealism; representations of the South; memory and the Shoah; terrorism and the 'Years of Lead'; 'Bribecity' and the advent of the Second Republic; and contemporary painting, particularly the 'Transvitalism' movement. Speculations are entertained on how recent Italian history raises broader questions about national history making and political memory, especially when compared with the French and German cases.

ITALL 300 Italian Practicum
Fall or spring. 1 credit. Conducted in Italian. Fall: T. Campbell and M. Migiel; spring: C. Campbell, M. Migiel and S. Stewart-Steinberg.
Students enrolled in an Italian literature or culture course that is conducted in English (e.g., ITALL 220, 224, 351, 369, 390, 396, 427, 456, and 457) may opt to take this one-credit Practicum in Italian, provided that they have already attained proficiency in the language. Students in the Practicum spend one class hour per week discussing selected issues or texts in Italian; they also complete an appropriate amount of written work in Italian.

ITALL 351 Machiavelli (also HIST 351) # (III or IV)
Fall. 4 credits. Conducted in English. J. Najemy.
For description, see HIST 351.

ITALL 369 History of Florence (also HIST 369) # (III or IV)
Spring. 4 credits. Conducted in English. J. Najemy.
For description, see HIST 369.

ITALL 389 Modern Italian Novel (IV)
Fall. 4 credits. Prerequisite: permission of instructor. Students who have taken ITALL 389 previously are permitted to re-take the course for credit, provided that the readings are different. Conducted in Italian. P. Swenson.
In this course we read novels by twentieth-century and contemporary novelists such as Ginzburg, Loy, Bassani, and P. Levi, and, in particular, we consider how the post-war modern novel explores the issues of history, time, memory and the relationship of the individual to the family, political engagement, and ethical responsibility.

ITALL 390 Fascist Bodies, Fascist Films (also ITALL 690) (IV)
Fall. 4 credits. Conducted in English.
T. Campbell.
We examine the depiction of fascism in films by Benigni, Bertolucci, Canevari, Cavani, de Sica, Pasolini, and Visconti.

ITALL 396 Italian Feminisms (also ITALL 696) (IV)
Spring. 4 credits. Conducted in Italian.
M. Migiel.
An introduction to the central issues in Italian feminist activity from the 1970s to the present. In addition to introducing students to the work of Italian feminist writers (principal among them Dacia Maraini) and the work of Italian feminist philosophers (Luisa Muraro, Adriana Cavarero, and other members of the group Diotima), the seminar also explores the Italian political debates about issues that affect women (including abortion, divorce, harassment, and violence against women).

ITALL 419–420 Special Topics in Italian Literature
419, fall; 420, spring. 2–4 credits each term. Prerequisite: permission of instructor.
T. Campbell and M. Migiel.
Guided independent study of specific topics.

ITALL 427 Dante: The Divine Comedy (also ITALL 627) # (IV)
Spring. 4 credits. Conducted in English.
W. Wetherbee.
A close reading of selected cantos from the three sections of Dante's *Divine Comedy*. Readings and class discussion are in English, but there is an opportunity for students with some Italian to read portions of the poem in the original.

ITALL 429–430 Honors in Italian Literature
429, fall; 430, spring. 8 credits year-long course. R, fall; letter grade, spring. Limited to seniors. Prerequisite: permission of instructor. M. Migiel.

ITALL 456 Opera, History, Politics, and Gender (also HIST 456, WOMNS 454, COML 459, S HUM 459, MUSIC 474) (III or IV)
Spring. 4 credits. Conducted in English.
M. Steinberg and S. Stewart-Steinberg.
For description, see HIST 456.

ITALL 457 Italian Renaissance Epic (also ITALL 657) # (IV)
Fall. 4 credits. Conducted in English.
M. Migiel.
This seminar focuses on the great Italian Renaissance epics—Ludovico Ariosto's *Orlando furioso* (1532) and Torquato Tasso's *Gerusalemme Liberata* (1581). We study how these poems used the situation of a war against non-Christian others in order to address questions that remain important to us today: Who am I? To what extent is my identity determined by the things I possess? By my (gendered) body? By the attributes others recognize in me? What place do love and desire have in the world of honor and moral excellence? How respectful should we be of difference, particularly if we aim to establish a unified community? What values do we wish to espouse and transmit to future generations? And finally: What role does writing have in this cultural operation?

ITALL 465 The Modern Post-Postmodernism in Italy (also ITALL 665) (IV)
Spring. 4 credits. Conducted in Italian.
T. Campbell.
Against the backdrop of recent, far-reaching changes in technology, we examine the movement that has come to be known as post modernism. The following issues are taken up in the context of mainly, though not exclusively, Italian literature: conceptions of temporality; the mass media; simulacra and dystopia; post-hermeneutics; and urban landscapes. Works by Calvino, Eco, Jameson, Kluge, Primo Levi, Lyotard, Manganelli, Pynchon, Tabucchi, and Vattimo are read.

ITALL 468 Love and Sex in the Italian Renaissance (also HIST 468) # (III or IV)
Spring. 4 credits. Conducted in English.
J. Najemy.
For description, see HIST 468.

ITALL 627 Dante: The Divine Comedy (also ITALL 427)
Spring. 4 credits. Conducted in English.
W. Wetherbee.
For description, see ITALL 427.

ITALL 639–640 Special Topics in Italian Literature
639, fall; 640, spring. 4 credits each term.
T. Campbell and M. Migiel.

ITALL 665 The Modern Post-Postmodernism in Italy
Spring. 4 credits. Conducted in Italian.
T. Campbell.
For description, see ITALL 465.

ITALL 657 Italian Renaissance Epic (also ITALL 457)
Fall. 4 credits. Conducted in English.
M. Migiel.
For description, see ITALL 457.

ITALL 690 Fascist Bodies, Fascist Films (also ITALL 390)
Fall. 4 credits. Conducted in English.
T. Campbell.
For description, see ITALL 390.

ITALL 696 Italian Feminisms (also ITALL 396)
4 credits. Conducted in Italian. M. Migiel.
For description, see ITALL 396.

Portuguese

Faculty: J. Oliveira

PORT 121–122 Elementary Portuguese
121, fall; 122, spring. 4 credits each term. Intended for beginners. Students may attain qualification upon completion of 122 by achieving a satisfactory score on a special examination. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. J. Oliveira.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

PORT 209@–219 Intermediate Composition and Conversation (formerly PORT 203–204)
209, fall; 219, spring. 3 credits each term. *PORT 209 provides language proficiency.* Prerequisites: for PORT 209, PORT 122 or permission of instructor; for PORT 219, PORT 209 or permission of instructor. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. J. Oliveira.
Conversational grammar review with special attention to pronunciation and the development of accurate and idiomatic oral expression. Includes readings in contemporary Portuguese and Brazilian prose and writing practice.

PORT 319 Readings in Luso-Brazilian Literature @ # (IV)
Fall or spring. 4 credits. Prerequisite: PORT 219 (formerly PORT 204) and permission of instructor. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U.
J. Oliveira.
This course takes a broad approach to selective writings of representative Luso-Brazilian authors from the nineteenth century to the present: Machado de Assis, Eca de Queriroz, Aluisio de Azevedo, Graciliano Ramos, Fernando Pesoa, Jorge Amado, and others.

Quechua

Faculty: L. Morató-Peña.

QUECH 121–122 Elementary Quechua (formerly QUECH 131–132)
121, fall; 122, spring. 4 credits each term. Prerequisite: qualification in Spanish. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. L. Morató-Peña.
A beginning conversation course in the Cuzco dialect of Quechua.

QUECH 136 Quechua Writing Lab
Spring. 1 credit. Prerequisite: concurrent enrollment in QUECH 122 or instructor's approval. Letter grade only.
L. Morató-Peña.
Computer-assisted drill and writing instruction in elementary Quechua.

QUECH 209–219 Continuing Quechua
209, fall; 219, spring. 3 credits each term. Prerequisites: for QUECH 209: QUECH 122 or equivalent; for QUECH 219: QUECH 209 or equivalent. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. L. Morató-Peña.
An intermediate conversation and reading course. Study of the Huarochiri manuscript.

QUECH 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor.
L. Morató-Peña.
Taught on a specialized basis to address particular student needs. Times arranged with instructor.

Romance Studies

ROM S 321 History of the Romance Languages (also LING 321) (III)
Fall. 4 credits. Prerequisites: LING 101 or equivalent and qualification in any Romance Language. C. Rosen.
Course topics include: popular Latin; pan-Romance trends in phonology, morphology, syntax, and the lexicon; regional divergence; non-Latin influences; Medieval diglossia; and emergence of Romance standards.

ROM S 322 History of the Romance Languages (also LING 322) (III)
Spring. 4 credits. Prerequisites: LING 101 or equivalent and qualification in any Romance Language. C. Rosen.
Covers the history of French, Italian, and Spanish from 850 to 1250 A. D. Includes

analysis of texts and an overview of other languages to present day. Considers elements of dialectology.

ROM S 433 The Lesser-Known Romance Languages (also LING 433) (III)
Fall. 4 credits. Prerequisite: LING 101 or equivalent and qualification in any romance language. C. Rosen.
The course surveys three or four Romance languages or dialects, examining their sound systems, grammars, and historical evolution from Latin. Includes some native speaker demonstrations. Readings represent both the modern languages and their earliest attested stages. Topic for fall 2001: Catalan, Romanian, a Northern Italian dialect, and a Rheto-Romance language.

Spanish

S. Amigo-Silvestre, C. Morón Arroyo, L. Carrillo, D. Castillo, E. Dozier (associate chair of language), M. A. Garcés, M. García-Calderón (visiting), Z. Iguina, C. Lawless, N. Maldonado-Méndez, L. Morató-Peña, J. E. Paz-Soldán, J. Piedra, M. K. Redmond, J. R. Resina, M. Rice, J. Routier-Pucci, E. Sánchez-Blake, A. Stratakos-Tió, M. Stycos, F. Unzueta (visiting), M. Valdez (visiting)
Emeritus: J. W. Kronik.

The Major

The Spanish major is designed to give students proficiency in the oral and written language, to acquaint them with Hispanic culture, and to develop their skill in literary and linguistic analysis. Satisfactory completion of the major should enable students to meet language and literature requirements for teaching, to continue with graduate work in Spanish or other appropriate disciplines, and to satisfy standards for acceptance into the training programs of the government, social agencies, and business concerns. A Spanish major combined with another discipline may also allow a student to undertake preprofessional training for graduate study in law or medicine. Students interested in a Spanish major are encouraged to seek faculty advice as early as possible. For acceptance into the major, students should consult Professor Ciriaco Arroyo, cma6@cornell.edu, the Director of Undergraduate Studies, in Morrill Hall 306, who will admit them to the major, and assign them an adviser from the Spanish faculty. Spanish majors will then work out a plan of study in consultation with their advisers. Spanish majors have great flexibility in devising their programs of study and areas of concentration. Previous training and interests as well as vocational goals will be taken into account when the student's program of courses is determined.

Students interested in majoring in Spanish linguistics should contact the Department of Linguistics.

All tracks include the following core:

SPANL 218 and SPANR 219 (or equivalent) are prerequisite to entering the major in Spanish. All majors will normally include the following core courses in their programs:

1. SPANR 311 and 312.
2. SPANL 316, 318, and 319 (not necessarily in that order)

Spanish Literature Option

The Spanish Literature Option normally includes at least 20 credits of Spanish literature beyond the core courses. Literature majors are strongly urged to include in their programs courses in all the major periods of Hispanic literature.

Spanish Language Option

A combination of literature and linguistics.

Area Studies Option (Spanish, Latin American, or U.S. Latino Studies)

At least 20 credits of courses at the 300 level and above in any of these focus areas beyond the core, all courses to be approved through consultation with the major adviser. Courses should reflect interdisciplinary interests in the area and may include up to three other academic fields of interest. For example, a student interested in Latin American studies may want to include courses on such topics as Latin American history, government, rural sociology, and economics. Students who want to specialize in U.S. Latino issues may want to include such topics as sociology of Latinos, Latino history, and Latino medical issues in addition to further studies in literature. Students planning on spending a year or semester in Seville (but not exclusively such students) frequently plan their coursework to emphasize Spanish history, art, political economy, and other related field courses, such as courses on Islam and Moorish Spain.

Students are encouraged to enrich the major program by including a variety of courses from related fields or by combining Spanish with related fields such as History, Philosophy, Sociology, Anthropology, Art, Music, Classics, English, Comparative Literature, and other foreign languages and literatures. The interdepartmental programs in Latin American Studies and Latino Studies sponsor relevant courses in a variety of areas.

The J. G. White Prize and Scholarships are available annually to students who achieve excellence in Spanish.

Study Abroad in Spain. Cornell, the University of Michigan, and the University of Pennsylvania cosponsor an academic year in Spain program. Students enrolled in this program spend the first month before the fall semester begins in an orientation session at the University of Seville, where they take coursework in Spanish language and culture and take advantage of special lectures and field trips in Andalucia. The College of Arts and Sciences awards three credits for orientation. Once the semester begins, students enroll in regular classes the University of Seville and at the program's center facility. Center courses are designed for the program and include a seminar offered by the resident director, from the faculty of either Cornell, Michigan, or Pennsylvania. Other center courses typically include history of art, history of the Mediterranean region, a literature course, and Spanish composition and syntax. In Seville, students live in private homes and a rich array of cultural activities and excursions are organized every semester.

Applicants are expected to have at least completed SPANR 219 prior to departure. Students are strongly encouraged to study abroad for the entire year rather than one semester. Students interested in the study abroad program should visit Cornell Abroad in 474 Uris and take a look at the Cornell Abroad web site: www.einaudi.cornell.edu/cuabroad.

Study Abroad in Bolivia: The Summer program in Cochabamba, Bolivia is sponsored by the Latin American Studies Program and accepts both undergraduate and graduate students. Students live with Bolivian families and normally take two courses with Cornell faculty who participate in this program. In addition to course work in Bolivian culture, politics, and social movements, the program features the opportunity to do intensive study in Quechua, the native language spoken by many Bolivians, as well as Spanish, and to participate in research and internships with grass-roots communities, government offices, and businesses.

Honors. Honors in Spanish may be achieved by superior students who want to undertake guided independent reading and research in an area of their choice. Students in the senior year select a member of the Spanish faculty to supervise their work and direct the writing of their honors essay (see SPANL 429–430).

Language

Enrollment in a language course is conditional upon the student's eligibility for the particular level and on attendance of the first scheduled class session. Further, a student who fails to attend the first three days of class will be automatically dropped from the course in order to accommodate those on the waiting lists.

All Spanish language courses are offered by the Department of Romance Studies, and Spanish linguistics courses are offered by the Department of Linguistics.

SPANR 112 Elementary Spanish: Review and Continuation
Fall. 4 credits. Prerequisite: LPS score 37–44. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. M. Rice and staff.
This course is designed for students who have taken some Spanish and who have a placement score of 37–44 or SAT II 370–450. It provides a basic review and then moves on to cover new material for the remainder of the term. Students who have taken SPANR 121 may enroll for this course. As part of the final exam, students take the LPS and, according to their score, may place into SPANR 123 (score below 56) or receive qualification (56 or above), and placement into the 200-level courses.

SPANR 121–122 Elementary Spanish
121, fall and summer; 122, spring. 4 credits each term. Prerequisite: for SPANR 122, SPANR 121. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. Fall: M. K. Redmond, S. Amigo-Silvestre and staff; spring: M. K. Redmond and staff.
This course is intended for students with no experience in Spanish. (Students who have previously studied 2 or more years of Spanish are not eligible for 121 unless they have an LPS score lower than 37 or SAT II lower than 370.) The course provides a thorough grounding in all language skills. Language practice in small groups. Lectures cover grammar, reading, and cultural information. Evening prelims.

SPANR 123 Continuing Spanish
Fall, spring, or summer. 4 credits. ***Provides language qualification.*** Prerequisite: SPANR 112, SPANR 122, or an LPS score 45–55 or SAT II 460–580. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. Fall: N. Maldonado-Méndez, C. Lawless, L. Morató-Peña and staff; spring: N. Maldonado-Méndez, L. Morató-Peña, E. Sánchez-Blake, and staff; summer: staff.
An all-skills course which requires daily preparation before class and active student participation in class. Includes researching cultural topics of the student's choice, oral presentations, grammar review, audio tapes, video, journal and essay writing, speaking in small groups, and authentic readings. Satisfactory completion of SPANR 123 fulfills the qualification portion of the language requirement. After this course, the student may take 207 (formerly 213) or 209 (formerly 203).

SPANR 200 Spanish for English/Spanish Bilinguals (also LSP 202)
Fall or spring. 3 credits. ***Provides language proficiency.*** Prerequisite: LPS score 56 or higher, SAT II 590 or higher, CASE placement, or permission of instructor. N. Maldonado-Méndez.
A course designed to expand bilingual students' knowledge of Spanish by providing them with ample opportunities to develop and improve each of the basic language skills. Not available to students who have taken SPANR 207 or 209.

SPANR 207 Intermediate Spanish for the Medical and Health Professions
Fall or spring. 3 credits. ***Provides language proficiency.*** Prerequisite: qualification in Spanish (SPANR 123, LPS score 56–64, or SAT II 590–680) or permission of instructor. Students who have taken SPANR 209 or 200 should speak to the instructor. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. A. Stratakos-Tió.
Conversational grammar review, with dialogues, debates, compositions, and readings on health-related themes. Special attention is given to relevant cultural differences.

SPANR 209 Intermediate Composition and Conversation I
Fall or spring. 3 credits. ***Provides language proficiency.*** Prerequisite: SPANR 123, LPS score 56–64, or SAT II 590–680. Not available to students who have taken SPANR 207. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. Fall: J. Routier-Pucci, Z. Iguina, and staff; spring: J. Routier-Pucci, S. Amigo-Silvestre and staff.
Conversational grammar review with special attention to the development of accurate and idiomatic oral and written expression. Includes composition-writing, the reading of Spanish and Spanish American short stories and poetry, and the viewing of several films.

SPANR 219 Intermediate Composition and Conversation II
Fall or spring. 3 credits. Prerequisite: SPANR 207 or 209, or CASE Q+, or permission of instructor. This course, or its equivalent, is required for admission to the Cornell Abroad program. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. Fall: E. Dozier, S. Amigo-Silvestre and staff: spring: E. Dozier, Z. Iguina, and C. Lawless.
An advanced-intermediate course designed for students who want to go beyond the basic language requirement, and further broaden their knowledge of the language and related cultures, as well as improve their comprehension and communication skills. This course guides students to take greater command of their own language learning process to optimize their continued progress. Includes a strategic focus on specific problems in listening, and reading comprehension, and in accurate writing and speaking.

SPANR 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. Times arranged with instructor. Staff.
Taught on a specialized basis to address particular student needs.

SPANR 310 Advanced Conversation and Pronunciation
Spring. 3 credits. Prerequisite: SPANR 219 or equivalent. Letter grades assigned unless student receives exceptional permission from the course coordinator for S-U. Z. Iguina.
A conversation course with intensive oral practice obtained through the production of video programs. Study of the fundamental aspects of communication in the standard spoken and written Spanish, with some focus on dialectal variations. Weekly pronunciation labs.

SPANR 311 Advanced Composition and Conversation I
Fall or spring. 4 credits. Prerequisite: SPANR 218 or 219 or CASE Q++ or equivalent. Fall: M. Stycos and staff; spring: staff.
Advanced language skills, developed through reading, grammar review, and intensive practice in speaking, writing, and translation. Analysis of present-day Spanish usage in a wide variety of oral and written texts.

SPANR 312 Advanced Composition and Conversation II
Fall or spring. 4 credits. Prerequisite: SPANR 311 or permission of instructor. Fall: M. Stycos; spring: staff.
Readings and class discussion focus on the stylistic analysis of modern texts. Increased emphasis, through weekly essays, on students' development of an effective Spanish prose style.

SPANR 366 Spanish in the United States (also LING 366 and LSP 366)
Fall. 4 credits. Prerequisite: some knowledge of Spanish. M. Suñer.
Examination of major Spanish dialects in the United States from a linguistic perspective. Topics include: contrast with the standard language; borrowing, interference, and code switching; syntactic, morphological, and phonological characteristics; and sex-related phenomena.

SPANR 630 Spanish for Reading
Spring. 3 credits. Limited to graduate students. J. Routier-Pucci.
Designed for those with little or no background in Spanish and little exposure to written Spanish, this course primarily aims to develop skill in reading Spanish. Grammar basics, extensive vocabulary, and strategies for reading in a foreign language are covered. The types of texts covered depend on the interests of the students in the course.

Literature

SPANL 218 Introduction to Hispanic Literature @ (IV)
Fall or spring. 3 credits. Prerequisite: SPANR 200, or 207, or 209 or CASE Q+, or permission of coordinator. The course is divided into small sections and is taught mainly in Spanish. The literature course that normally follows SPANL 218 is either 316 or 318.) C. Lawless and staff.
An intermediate course designed to improve reading, writing, speaking, and comprehension skills in Spanish through the reading and discussion of contemporary literary works of various genres (narrative prose, drama, poetry) from Spain and Spanish America. Emphasis is placed on the development of fluency in reading and of critical and analytical abilities. The cultural, sociological, and aesthetic implications of texts by authors such as Borges, Cortázar, Fuentes, García Márquez, García Lorca, and Cela are considered.

SPANL 246 Contemporary Narratives by Latina Writers (also LSP 246 and WOMNS 246) (IV)
Fall. 3 credits. Conducted in English. L. Carrillo.
This course offers a survey of narratives, including novels, short fiction, essays, political/feminist manifestoes and memoirs by representative Latina writers of various Latino ethnic groups in the United States and the Americas including, Chicana, Chilean, Cuban, Dominican, and Puerto Rican, among others. We investigate the parallel development of a Latina perspective on personal, social and cultural issues alongside that of the U.S. ethnic liberation/revitalization movements of the 1960's through to contemporary feminist activism and women of color movements. We investigate these works as artistic attempts to deal with issues of culture, language and bilingualism, family, gender, sexuality, and domesticity among others. We account for regional distinctions and contributions. Readings include works by Julia Alvarez, Elena Castedo, Sandra Cisneros, Judith Ortiz Cofer, Cristina García, Ana Lydia Vega, and others.

SPANL 301 Hispanic Theater Production
Fall or spring. 1–2 credits. E. Sánchez-Blake.
Students involved in Hispanic Theater Production develop a specific dramatic text for full-scale production. The course involves selection of an appropriate text, close analysis of the literary aspects of the play, and group evaluation of its representational value and effectiveness. All students signing up for the course are involved in some aspect of production of the play, and write a final paper as a course requirement. Credit is variable depending upon the student's role in play production: a minimum of 50 hours of work is required for one credit; a maximum of two credits will be awarded for 100 hours or more of work.

SPANL 316 Readings in Modern Spanish Literature (IV)
Fall or spring. 4 credits. Conducted in Spanish. Prerequisite: SPANR 218, 219 or CASE Q++, or permission of instructor. Fall: C. Arroyo and M. Stycos; spring:

J. Resina and C. Lawless. Readings and discussion of representative texts from Spain from the Romantic period to the present. Bécquer, Galdós, Unamuno, García Lorca, Cela, and others.

SPANL 318 Readings in Modern Spanish American Literature (IV)

Fall or spring. 4 credits. Conducted in Spanish. Prerequisite: SPANR 218, 219, or CASE Q++, or permission of instructor. Fall: M. García-Calderón and E. Sánchez-Blake; spring, E. Sánchez-Blake and J. Paz-Soldán.

Readings and discussion of representative texts of the nineteenth and twentieth centuries from various regions of Spanish America. Among the authors considered are Darío, Borges, Cortázar, García Márquez, and Valenzuela.

Note: The prerequisite for the following courses, unless otherwise indicated, is SPANL 316 and 318 or permission of instructor.

SPANL 319 Renaissance Hispanisms # (IV)

Fall or spring. 4 credits. Conducted in Spanish. Prerequisite: SPANL 316 and SPANL 318. SPANR 312 is recommended. Fall, M. A. Garcés; spring, C. Arroyo.

In Spain, the cultural revolution known as the Renaissance produced a glittering array of artistic works—both in literature and the arts—which gave rise to the term Golden Age. There was a "darker side" to the Renaissance, however, which juxtaposed the conquest of America with the establishment of the Inquisition and the expulsion of the Jews. The tale of these relations of exclusion and fascination with the *other* is recapitulated by the literature of the period. Readings may be drawn from Columbus, Cabeza de Vaca, *Lazarillo de Tormes*, Garcilaso de la Vega, San Juan de la Cruz, Cervantes, Maria de Zayas, Quevedo, Lope de Vega, and Calderón, among others.

SPANL 320 Perspectives on Latin America (also LSP 301) @ (IV)

Spring. 3 credits. Conducted in English. M. García-Calderón.

This interdisciplinary, co-taught course is offered every spring through the Latin American Program. It is highly recommended for Latin American Studies Concentrators. Topics will vary by semester, but readings always focus on current research in various disciplines and regions of Latin America. The range of issues addressed include the economic, social, cultural, and political trends and transitions in the area. In the weekly meetings, instructors and guest lecturers facilitate student discussions. Students taking the course are required to participate in all class discussions and write one research paper in their chosen focus area.

SPANL 339 Islamic Spain: Culture and Society (also NES 339, JWST 339, COML 334, RELST 334, and SPANL 699) @ # (IV)

Fall. 3 credits. R. Brann.

For description, see NES 339.

SPANL 346 Hispanic Caribbean Culture and Literature @ (IV)

Fall. 4 credits. Conducted in Spanish. M. García-Calderón.

An introduction to the history, culture and literature of the Hispanic Caribbean, with major emphasis on Cuba, Puerto Rico, and the Dominican Republic. Analysis of the cultural and social peculiarities of the Caribbean area. Includes discourses of national identity and the emergence of alternative subjectivities in the literatures of the region. Topics include: racial, generic and sexual otherness; hybridity and translocality in the context of contemporary globalization; and postmodernity in the region. Authors such as Martí, Hostos, Ortíz, Guillén, Palés Matos, Carpentier, Lezama Lima, Piéra, Arenas, Sánchez, Ferré, Valdés, Estévez, Vergés, Veloz Maggiolo, Hernández, Díaz, Ramos Otero, Rodríguez Juliá, Vega, García Ramis, and Santos-Febres are included. Supplemental theoretical readings to include such authors as Ortiz, Cornejo Polar, Benítez Rojo, García Canclini, Ramos, Sommer, Bhadha, Butler.

SPANL 374 Caribbean Popular Culture (IV)

Spring. 4 credits. Conducted in Spanish. M. García-Calderón.

Is the category of "popular" taken for granted? What do we in fact mean when we describe a particular clothing style, film, television show, or music video as "popular"? Can works of art be "popular", or is this expression reserved for objects, practices, and images associated with the common and everyday? Do distinctions persist between high and low culture, or is every aspect of culture commercial? These questions spark the major tensions of this course. We investigate the concept of the popular historically as well as critically through the cultural representations of the Hispanic Caribbean. Our exploration into these cultural representations seeks to interrogate how popular culture has been studied, theorized, and defined within academic discourses to help locate the function of the popular within contemporary culture. Readings include theoretical texts by Benjamin, Adorno, Eco, Bennet, García Canclini, Martín Barbero, and others. Primary texts by Cabrera Infante, Ferré, Lugo Filippi, Vega Montero, Paz, Rodríguez Juliá, Sánchez, Vergés, Padura, Ramos Otero, and Valdés are discussed.

SPANL 399 Spanish Film (IV)

Fall. 4 credits. Conducted in Spanish. Prerequisite: SPANL 218 or 311 or permission of instructor. Screenings to be announced. J. R. Resina.

Examines the evolution of Spanish cinema since Franco's death in 1975, both from a historical and a cinematic perspective. The focus is on documentary, fictional and allegorical reconstruction of the past, and on the images of the new democratic society which illustrate a postmodern aesthetic. Selected films include works by directors who started their careers under the dictatorship (Saura, Erice, Borau) and by members of the younger generation, such as Almodóvar.

SPANL 403 After Immigration (also HUM S 403 and LSP 403) (IV)

Spring. 4 credits. D. Castillo.

Beginning with a close reading of Michael Jones-Correa's seminal study of Latinos in New York, *Between Two Nations*, we focus class discussion on recent Latin American immigration to the United States through two complementary perspectives and meditations on the immigrant experience: that of the individuals who have arrived in the US, and that of individuals who have chosen to remain in the countries of origin. The class covers films like *Nueva Yol* and *Jardin de Edén*, Latin American authors like Carlos Fuentes, Ana Lydia Vega, and Ariel Dorfman, and US Latinos like Julia Alvarez, Francisco Goldman, and Cristina Garcia. Students are encouraged to do individually-tailored research projects that may include autobiographical or ethnographic elements as well as literary analysis and theoretical inquiries.

SPANL 419–420 Special Topics in Hispanic Literature

419, fall; 420, spring. 2–4 credits each term. Prerequisite: permission of instructor. Staff.

Guided independent study of specific topics. For undergraduates interested in special problems not covered in courses.

SPANL 425 Prehispanic Mexico in Twentieth Century Mexican Literature (IV)

Spring. 4 credits. M. Valdes.

This course will examine the extensive research on prehispanic Mexico carried out by Miguel León Portilla and others in the last forty years and consider its incorporation into the work of Octavio Paz, Carlos Pellicer, Carlos Fuentes, Juan Rulfo and José Emilo Pacheco.

SPANL 429–430 Honors Work in Hispanic Literature

429, fall; 430, spring. 8 credits. Year-long course, R grade fall semester, letter grade spring semester. Limited to seniors with a superior academic record. Prerequisite: permission of instructor. C. Arroyo and staff.

SPANL 440 Medieval Spanish Literature # (IV)

Fall. 4 credits. Conducted in Spanish. C. Arroyo.

Readings from *Mío Cid* to *Celestina*. Emphasis is on concepts (learned vs. popular, topos vs. personalism, pro-anti-feminism, courtly love) in European perspective. Considers cultural distance and "assimilation" through reading.

SPANL 447 The Spanish American Novel: Origins and Transformations (IV)

Fall. 4 credits. F. Unzueta.

This course presents a (critical) survey of the first 150 years of Spanish American novels (c 1820–1950), exploring its origins and multiple transformations. It considers different theories of the novel, the major literary movements of the era (Neoclassicism, Romanticism, Realism, modernismo, the novela de la tierra and the New Novel), and documents containing a Spanish American poetics of the novel. Some other critical problems addressed are: genre theory, periodization and literary histories, the constitution of subjects, and the incorporation of history and "reality" in the novel.

SPANL 484 Nationalism and Literature (also COML 484) (IV)

Spring. 4 credits. Conducted in English. Prerequisite: demonstrated reading ability in Spanish. J. R. Resina.

What are nations? How did they form in history? What is their role in the present? How do they affect the cultural field and the formation of literary canons? What is the difference between the nation-state and stateless nations? How do they relate and sometimes clash, in the cultural arena? These and related questions are the focus of this course, in which theoretical readings are supplemented by literary texts, primarily but not exclusively from the Spanish literary tradition.

SPANL 639–640 Special Topics in Hispanic Literature
639, fall; 640, spring. 2–4 credits each term. Staff.

SPANL 645 The Concept of Self in the Nineteenth- and Twentieth-century Spanish Novel
Spring. 4 credits. M. Valdes.
This course examines the development in Spain of a dialectic approach to self-identity and communal identity beginning with the Catalan intellectual Santiago Ramon y Cajal and including the most important thinkers of the early twentieth century especially Miguel de Unamuno and Jose Ortega y Gasset. The Spanish perspective on the self will be outlined in response to Paul Ricoeur's seminal book "Oneself as Another" in order to set up the hermeneutic framework form commentary on major Spanish narrative texts of the late nineteenth century and early twentieth century including works of Leopoldo Alas, Benito Peerez Galdós, Emilia Pardo Bazán, José Martinez Ruíz and Miguel de Unamuno.

SPANL 651 Spanish Golden Age Drama
Fall. 4 credits. Conducted in Spanish. M. A. Garcés.
This seminar explores the rise and reign of Spain's remarkable national theater in the sixteenth and seventeenth centuries, from the birth of the drama to the emergence of the *comedia*, which produced truly popular great art, to the highly intellectual and artfully crafted drama of Calderón. Summarizing the most recent theoretical approaches to Golden Age Spanish theater, such as genre and performance studies, reception theory, feminist and psychoanalytic analyses, among others, we study the Spanish *corrales* and their audiences, *comedia* texts, captivity plays, and dramatic productions on the New World in works by Cervantes, Lope de Vega, Tirso de Molina, Ruiz de Alarcón, María de Zayas, and Calderón.

SPANL 653 Don Quijote: And the Theory of Reading a Classic
Spring. 4 credits. C. Arroyo.
Explanation of the text; plot and characterization: Cervantes' originality and the literary theory of his time: Castelvetro, Pinciano, etc. Basic questions on the culture of the period such as Cervantes' Erasmianism and other texts; Don Quijote in the development of the European novel, and the critical reception of the text (Calderon, Fielding, etc.). Finally, the question of value: the idea of a literary masterpiece in the aesthetic and humanistic sense.

SPANL 670 Constituting National Subjects
Fall. 4 credits. F. Unzueta.
This course explores the constitution of "national subjects" in a range of 19th-Century Spanish American discourses, including novels, autobiographies, essays, and cuadros de costumbres. It will trace some of the transformations of hombres de bien into abstract citizens and a range of socially differentiated national subjects. We will seek theoretical articulations of the notion of the "subject," and study how subjects insert themselves in, or resist, dominant discourses, ideologies and hegemonic projects.

SPANL 698 The Latin American "Boom"
Spring. 4 credits. Conducted in Spanish. J. Paz-Soldán.
This course examines the writers of the "Boom", paying close attention to their experimentation with narrative form and their bold ambition to write "la novela total". We read essays and novels by Garcia Marquez, Vargas Llosa, Cortazar, Cabrera Infante, and Fuentes. Due to the length of the novels, expect intensive reading.

RUSSIAN

N. Pollak, chair (226F Morrill Hall); P. Carden, director of undergraduate studies [literature], (226B Morrill Hall); S. Paperno, director of Russian Language Program (226E Morrill Hall); 255–8350; E. W. Browne, L. Paperno, S. Paperno, S. Senderovich, G. Shapiro, V. Tsimberov

The Russian Major

Russian majors study Russian language, literature, and linguistics, and emphasize their specific interests. It is desirable, although not necessary, for prospective majors to complete RUSSA 121–122, 201–202, and 203–204 as freshmen and sophomores, since these courses are prerequisites to most of the junior and senior courses that count toward the major. Students may be admitted to the major upon satisfactory completion of RUSSA 122 or the equivalent. Students who elect to major in Russian should consult Professor Carden as soon as possible. For a major in Russian, students are required to complete (1) RUSSA 301–302 or 303–304 or the equivalent, and (2) 18 credits from 300- and 400-level literature and linguistics courses, of which 12 credits must be in literature in the original Russian.

Certain courses may, with the permission of the instructor, be taken for one additional hour's credit. Such courses involve a one-hour section each week with work in the Russian language. Students may count two one-hour credits towards the 12 hours of Russian literature in the original language required for the major.

Study Abroad

Cornell is an affiliated institution with the Council on International Educational Exchange program for Russian language study at St. Petersburg State University. Cornell students also frequently attend the American Council of Teachers of Russian program in Moscow and other Russian language programs. Opportunities are available for study during the summer, a single semester, or the full year. Further information is available from W. Browne, in the Department of Linguistics.

Honors. Students taking honors in Russian undertake individual reading and research and write an honors essay. Students planning to take honors should consult Professor Carden in their junior year.

Fees. Depending on the course, a small fee may be charged for photocopied texts for course work.

[Freshman writing seminar requirement. The following course satisfies the freshman writing seminar requirement: Russian 104. Not offered 2001–2002.]

Russian Language

For details on all Russian language courses, see: http://russian.dmll.cornell.edu.

RUSSA 103–104 Conversation Practice
103, fall; 104, spring. 2 credits each term. Must enroll in one section of 103 and one section of 121 in the fall; and one section of 104 and one section of 122 in the spring. L. Paperno.
A highly interactive conversation class. Multimedia materials on our web site must be used on computers in the language lab or on the students' own computers.

RUSSA 121–122 Elementary Russian through Film
121, fall or summer; 122, spring or summer. 4 credits each term. May be taken alone and qualification will be achieved with satisfactory completion of 121–122–123; or may be taken concurrently with 103–104 and qualification will be achieved at completion of 122–104. L. Paperno, S. Paperno, V. Tsimberov.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing. Course materials include clips from original Russian films and TV programs.

RUSSA 123 Continuing Russian
Fall. 4 credits. ***Provides language qualification***. Limited to students who have previously studied Russian or been placed by department. Satisfactory completion of RUSSA 123 fulfills the qualification portion of the language requirements. L. Paperno, S. Paperno, V. Tsimberov.
A course designed to prepare students for study at the 200 level. Authentic Russian materials are used: TV, books, etc.

RUSSA 203–204 Intermediate Composition and Conversation
203, fall or summer; 204, spring or summer. 3 credits each term. ***Provides language proficiency***. Prerequisites: for RUSSA 203, qualification in Russian (RUSSA 123 or placement by department); for RUSSA 204, RUSSA 203 or equivalent. L. Paperno, S. Paperno, V. Tsimberov.
Guided conversation, composition, reading, pronunciation, and grammar review, emphasizing the development of accurate and idiomatic expression in the language. Course materials include CD-ROMS with clips from an original Russian feature film and work with Russian web sites.

RUSSA 205–206 Reading Russian Press
205, fall; 206, spring. 2 credits each term. ***RUSSA 206 provides language proficiency***. Prerequisite: qualification in Russian (RUSSA 123 or placement by department). Both semesters must be taken in order to satisfy the proficiency level for the language requirement. This course cannot be used to satisfy the humanities requirement. S. Paperno.
In this course students read unabridged articles on a variety of topics from current Russian periodicals and web pages.

Note: Students placed in the 200-level courses also have the option of taking courses in introductory literature; see separate listings under RUSSL 201 and 202 for descriptions of these courses, any of which may be taken concurrently with the 203–204 and 205–206 language courses described above.

RUSSA 300 Directed Individual Studies
Fall or spring. 1 credit. Prerequisite: permission of instructor. Times arranged with instructor. Staff.

Taught on a specialized basis to address particular student needs usually related to a project or interests not addressed in other Russian courses.

RUSSA 303–304 Advanced Composition and Conversation
303, fall; 304, spring. 4 credits each term. Prerequisites: for RUSSA 303, RUSSA 204 or equivalent; for RUSSA 304, RUSSA 303 or equivalent. L. Paperno, S. Paperno, V. Tsimberov.
Course involves writing, reading, and conversation. Involves viewing and reading authentic language materials such as current Russian films (feature and documentary), newspapers, TV programs, and Russian web sites.

RUSSA 305–306 Directed Study in Writing and Grammar
305, fall; 306, spring. 2 credits each term. Prerequisite: placement by the department. Staff.
This course is intended for students with special needs (e.g., children of Russian immigrants who speak Russian at home but have not learned to read or write grammatically correct Russian) that cannot be met by any other Russian course.

RUSSA 309–310 Advanced Reading
309, fall; 310, spring. 4 credits each term. Prerequisites: for RUSSA 309, RUSSA 204; for RUSSA 310, RUSSA 309 or equivalent. L. Paperno, S. Paperno, V. Tsimberov.
The purpose of the course is to teach advanced reading skills. The weekly reading assignment is 20–40 pages of unabridged Russian prose, fiction or non-fiction. The discussion of the reading is conducted entirely in Russian and is centered around the content of the assigned selection. When possible, a special section for native speakers of Russian is taught, with larger reading assignments—up to 130 pages per week. This course can *not* be used to satisfy the Humanities requirement.

[RUSSA 401–402 History of the Russian Language (also LING 417–418) (III)
401, fall; 402, spring. 4 credits each term. Prerequisites: for RUSSA 401, permission of instructor; for RUSSA 402, RUSSA 401 or equivalent. Offered alternate years. Not offered 2001–2002. W. Browne.
Course considers phonological, morphological, and syntactic developments from old Russian to modern Russian.]

[RUSSA 403–404 Linguistic Structure of Russian (also LING 443–444) (III)
403, fall; 404, spring. 4 credits each term. Prerequisites: for RUSSA 403, LING 101 and permission of instructor, for RUSSA 404, RUSSA 403 or equivalent. Offered alternate years. Not offered 2001–2002. W. Browne.
A synchronic analysis of the structure of modern Russian. RUSSA 403 deals primarily with phonology and 404 with syntax and word order. Topics covered include case theory, the functions of word order, voice, agreement, impersonal constructions, negation, nonuniversal categories, and the relation between morphology and syntax.]

RUSSA 413–414 Advanced Conversation and Stylistics
413, fall; 414, spring. 2 credits each term. Prerequisites: for RUSSA 413, RUSSA 303–304 or the equivalent, for RUSSA 414, RUSSA 413 or equivalent. V. Tsimberov.
Discussion of authentic unabridged Russian texts and films (feature or documentary) in a variety of nonliterary styles and genres.

RUSSA 601 Old Church Slavonic (also LING 661)
Fall. 4 credits. Prerequisite: students should know a Slavic or classical Indo-European language. This course is prerequisite to RUSSA 602 and 651. Offered alternate years. W. Browne.
Grammar and reading of basic texts.

RUSSA 602 Old Russian Texts (also LING 662)
Spring. 4 credits. Prerequisite: RUSSA 601. Offered alternate years. W. Browne.
Grammatical analysis and close reading of Old Russian texts.

RUSSA 633–634 Russian for Russian Specialists
633, fall; 634, spring. 1–4 credits variable. Prerequisite: 4 years of college Russian. For graduate and advanced undergraduate students. L. Paperno, S. Paperno.
The course is designed for students who specialize in an area of Russian studies requiring fine active control of the language. Fine points of syntax, usage, and style are discussed.

RUSSA 651–[652] Comparative Slavic Linguistics (also LING 671–672)
651, fall; [652, spring]. 4 credits each term. Prerequisites: for RUSSA 651, RUSSA 601 taken previously or simultaneously or permission of instructor, for RUSSA 652, RUSSA 651 or permission of instructor. Offered alternate years. W. Browne.
Covers sounds and forms of the Slavic languages and of prehistoric common Slavic. Also covers main historical developments leading to the modern languages.

[RUSSA 700 Seminar in Slavic Linguistics
Offered according to demand. Variable credit. Not offered 2001–2002. Staff.
Topics chosen according to the interests of staff and students.]

Russian Literature

A variety of courses are offered in Russian Literature; some course readings are in English translation, others are in the original Russian, others use both. The connection between Russian history, society, and literature is particularly close, so instruction and discussion in class often include a variety of topics, such as culture and intellectual history, as well as literature. Several courses are interdisciplinary, cosponsored with the departments of History, Economics, Government, Comparative Literature, and others.

First-Year Writing Seminars: consult the John S. Knight Institute brochure for times, instructors, and descriptions.

RUSSL 201–202 Readings in Russian Literature (IV)
201, fall; 202, spring. 3 credits each term. Prerequisite: qualification in Russian. Open to freshmen. 201 is prerequisite to 202. Separate sections for native and nonnative speakers of Russian, each co-taught by language and literature faculty. For the native speaker section, proficiency in Russian is required. Proficiency is achieved by completing RUSSA 203 or passing a placement test that is always given a few days before the beginning of the semester and is usually announced on the web site (russian.dmll.cornell.edu) as well as in other ways. For the nonnative speaker section, qualification in Russian is required, and proficiency is achieved by successfully completing RUSSL 201 or 202. N. Pollak.
These courses, the first that students take after qualification in Russian, serve as an introduction to Russian literature in the original language. Readings in prose and verse may include works by Pushkin, Lermontov, Tiutchev, Fet, Tolstoy, Chekhov, and others.

[RUSSL 207 Themes from Russian Culture # (IV)
Spring. 3 credits. Not offered 2001–2002; next offered 2002–2003. G. Shapiro.
This course is based on lectures, discussions, and audio-visual presentations (slides, tapes, films). Included within its scope are various aspects of Russian culture such as literature, art, music, religion, philosophy, and social thought from its very beginning through the eighteenth century. The course is designed to give undergraduates a broad familiarity with the cultural traditions of the country which plays a major role in the world today. Russian culture is presented as part of Western civilization with attention given to its distinctive character. The basic texts are literary works of moderate length in English translation.]

[RUSSL 208 Themes from Russian Culture II (IV)
Spring. 3 credits. Not offered 2001–2002. G. Shapiro.
This course is based on lectures, discussions, and audiovisual presentations (slides, tapes, films). Included are various aspects of Russian culture such as literature, art, music, religion, philosophy, and social thought over the last 200 years. The course is designed to give undergraduates a broad familiarity with the cultural traditions of the country that plays a major role in the world today. Russian culture is presented as part of Western civilization with attention given to its distinctive character. The basic texts are literary works of moderate length in English translation.]

[RUSSL 279 The Russian Connection, 1830–1867 (also COM L 279) # (IV)
Fall. 3 credits. Not offered 2001–2002. P. Carden.
As Russian prose began to find its voice, it responded with enthusiasm to the European prose tradition. One line of development in the Russian novel began with Rousseau's division between the needs of individual growth, nourished by solitude and introspection, and the demands of society. Tolstoy's *War and Peace* can be read as a summary and a testing of the novelistic tradition that grew out of the work of Rousseau, in both European and Russian literature. We follow the line that leads to Tolstoy's multifaceted inquity, beginning with two short novels that set the tone for the introspective novel in the two traditions, Constant's *Adolphe* and Lermontov's *Hero of Our Time*. Looking at relevant excerpts from a range of European prose writers, Rousseau, Musset, Goethe, Stendhal, Thackeray among others, we think about the possibilities and limitations of the introspective novel as a form, especially as manifested in one of the monuments of the genre, *War and Peace*.]

[RUSSL 280 The Russian Connection, 1870–1960 (also COM L 280) (IV)
Spring. 3 credits. Not offered 2001–2002. P. Carden.

The European novel of introspection developed a second line of inquiry, in some respects counter to the tradition that grew out of the writings of Rousseau. Diderot's "Rameau's Nephew" may be taken as emblematic of a novel that goes beyond the search for self-understanding to focus on alientation, resentment, and rebellion. Dostoevsky was the inheritor of this line in the European prose tradition. His works, in particular *Notes from Underground* and *The Idiot*, are the focal point of our discussion. We follow up the tradition as Dostoevsky's influence returns the line to Europe in the works of writers like Camus and Sarraute.]

RUSSL 331 Introduction to Russian Poetry # (IV)
Fall. 4 credits. Prerequisites: RUSSL 202 or equivalent and permission of instructor. This course may be counted toward the 12 credits of Russian literature in the original language for the Russian major. S. Senderovich.
A survey of Russian poetry with primary emphasis on the analysis of individual poems by major poets.

[RUSSL 332 Russian Drama and Theatre (also THETR 322, COM L 322) # (IV)
Spring. 4 credits. Not offered 2001–2002; next offered 2002–2003. S. Senderovich.
Covers selected topics. Includes discussion of a number of the most representative Russian plays of the nineteenth and twentieth centuries in chronological order. Offers introductions to the historical period, cultural atmosphere, literary trends, and crucial moments in the history of the Russian theater. Among the works studied are Gogol's *Inspector General,* Ostrovsky's *The Storm*, and Chekhov's *The Cherry Orchard*. All readings are in English translation. Additional assignments in critical literature are made for graduate students.]

[RUSSL 333 Twentieth-Century Russian Poetry (IV)
Spring. 4 credits. Not offered 2001–2002. N. Pollak.
Course involves close readings of lyrics by major twentieth-century poets. All readings are in Russian. Geared towards undergraduates.]

RUSSL 334 The Russian Short Story (IV)
Spring. 4 credits. Prerequisites: RUSSL 202 or equivalent and permission of instructor. This course may be counted toward the 12 credits of Russian literature in the original language for the Russian major. P. Carden.
A survey of two centuries of Russian story telling. Emphasis is on the analysis of individual stories by major writers, on narrative structure, and on related landmarks of Russian literary criticism.

[RUSSL 335 Gogol # (IV)
Fall. 4 credits. Not offered 2001–2002. G. Shapiro.
Selected works of Gogol are read closely and viewed in relation to his life and to the literature of his time. Readings are in English translation.]

[RUSSL 337 Films of Russian Literary Masterpieces (also COM L 338) (IV)
Fall. 4 credits. Not offered 2001–2002; next offered 2002–2003. S. Senderovich.
War and Peace and *Dr. Zhivago* are well-known American films relating to Russian literature of the nineteenth and twentieth centuries. Russian literature has been a matter of great interest both in the West and East. A clear cut practice of cultural translation is presented by film versions of Russian literary masterpieces. We perform a comparative analysis of these films, which provides an excellent opportunity for discussing problems of translation between various media and of cultural translation.]

[RUSSL 350 Education and the Philosophical Fantasies (also COM L 350) # (IV)
Fall. 4 credits. Not offered 2001–2002; next offered 2002–2003. P. Carden.
A major philosophical tradition has conceived of education as encompassing the whole of our lives. What we should do or be is seen as the result of every choice we make. The whole of our human context is understood as a school in which we form ourselves. This all-encompassing vision of education has been embodied in the works of the great philosopher-fantasists who use the forms of fiction to explore fundamental issues of education. In this course we examine several key philosophical fantasies, among them Plato's *Republic*, Rousseau's *Emile*, and Tolstoy's *War and Peace*. Our aim is to understand how the discourse on education became a central part of our Western tradition.]

RUSSL 367 The Russian Novel (also COM L 367) # (IV)
Fall. 4 credits. Special discussion section for students who read Russian. N. Pollak.
The rise of the Russian novel in the nineteenth century. Works by Pushkin, Gogol, Turgenev, Dostoevsky, Tolstoy and Chekhov.

[RUSSL 368 Russian Literature from 1917 to the Present (IV)
Spring. 4 credits. Also open to graduate students. No prerequisites. There will be a special section for students who read Russian. Not offered 2001–2002. Staff.
Readings are done in English translation. Course works as a survey of Russian literature focusing on the most important writers. Among the themes explored are Russian Modernism, social command, socialist realism, the Thaw, dissident and emigre literature, and post-modernism. Writers include Blok, Mayakovsky, Babel, Olesha, Platonov, Pasternak, Nabokov, Solzhenitsyn, the two Erofeevs, and contemporary women poets and short story writers.]

RUSSL 369 Dostoevsky (also COM L 332) # (IV)
Spring. 4 credits. P. Carden.
This course involoves close reading of novels and short works by Fyodor Dostoevsky. Doestoevsky's fiction is in contentious dialogue with the literature and philosophy of the preceding century and opens out to the literature and philosophy of the following century. This critique of European culture, his searching examination of the interior life, and his bold experiments with narrative make his work seminal in world fiction. In this course we read *Notes From Underground, Crime And Punishment, The Idiot,* and *Brothers Karamazov.*

RUSSL 373 Chekhov in the Context of Contemporary European Literature and Art (also COM L 375) # (IV)
Spring. 4 credits. S. Senderovich.
Reading and discussion of Anton Chekhov's short stories in the context of the European art of the short story and painting of that era. The course is designed for nonspecialists as well as literature majors. All reading is in English translation.

[RUSSL 385 Reading Nabokov (also COM L 385 and ENGL 379) (IV)
Fall. 4 credits. Not offered 2001–2002. G. Shapiro.
This course offers an exciting trip into the intricate world of Nabokovian fiction. After establishing himself in Europe as a distinguished Russian writer, Nabokov, at the outbreak of WWII, came to the United States where he reestablished himself, this time as an American writer of world renown. In our analysis of the Nabokovian artistic universe, we focus on his Russian corpus of works, from *Mary* (1926) to *The Enchanter* (writ. 1939), all in English translation, and examine the two widely read novels that he wrote in Ithaca while teaching literature at Cornell—*Lolita* (1955) and *Pnin* (1957).]

RUSSL 393 Honors Essay Tutorial
Fall and spring. 8 credits. Must be taken in two consecutive semesters in senior year. Credit for the first semester will be awarded upon completion of second semester. For information, please see Director of Undergraduate Studies.

RUSSL 409 Russian Stylistics
Fall. 4 credits. Also open to graduate students. Prerequisite: 3 years of Russian. S. Senderovich.
This course goes a few steps beyond normative grammar. Provides an introduction to the subtleties of idiomatic Russian on the levels of morphology, syntax, vocabulary, and phraseology. Also provides an introduction to the genres of live colloquial and written language. Students develop writing skills through short assignments and their analyses. Introduces first notions of literary stylistics and their practical application.

[RUSSL 415 Post-Symbolist Russian Poetry (IV)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002; next offered 2003–2004. N. Pollak.
We examine works by three poets in the first quarter of this century: Innokentij Annenskij, the Symbolist whom the Acmeists considered their mentor; Osip Mandelstam, a founding Acmeist; and Boris Pasternak, associated, at least for a time, with the Futurists. Through close readings of their verse and also critical prose and manifestoes, we attempt to determine some of the general features that link poets of such diverse orientations in the years following the crisis of Symbolism. We also outline the features that distinguish them as representative of their respective movements.]

[RUSSL 425 Vladimir Nabokov vs. Jean-Paul Sartre (also COM L 445) (IV)
Spring. 4 credits. Not offered 2001–2002; next offered 2003–2004. S. Senderovich.
Jean-Paul Sartre reviewed Nabokov's *Despair* in 1938. Ten years later Nabokov returned the favor in his review of the English translation of Sartre's *La Nausée*. The apparent tension between the two celebrated men of European letters of the twentieth century allows us to look at the works of both through the eyes of the other, to go into the problems of Existentialist philosophy, into Nabokov's brand of it, and into responses to Sartre in Nabokov's works. The latter gives an excellent yet unexplored approach to the poetic world

of Vladimir Nabokov. Nabokov's major response to Sartre occurred in the novel *Pnin* written in Ithaca and largely about Cornell.]

[RUSSL 427 Russian Formalism (also COM L 427) (IV)
Fall. 4 credits. Not offered 2001–2002. N. Pollak.]

[RUSSL 430 Practice in Translation (IV)
Spring. 4 credits. Prerequisites: proficiency in Russian or approval of instructors. Not offered 2001–2002; next offered 2002–2003. W. Browne and S. Senderovich.
A practical workshop in translation: documents, scholarly papers, literary works (prose and poetry). Translation mostly from Russian to English, partly from English to Russian. Attention is paid to problems and development of skills.]

[RUSSL 431 Contemporary Russian Prose (IV)
Spring. 4 credits. Prerequisites: RUSSL 301–302 or 303–304, and permission of instructor. This course may be counted towards the 12 credits of Russian literature in the original language for the Russian major. Graduate students may audit the course. Not offered 2001–2002. Staff.]

RUSSL 432 Pushkin # (IV)
Spring. 4 credits. Prerequisites: RUSSL 202 or equivalent, and permission of instructor. This course may be counted towards the 12 credits of Russian literature in the original language for the Russian major. S. Senderovich.
Reading in the original language and discussion of selected works by Pushkin: lyrics, narrative poems, and *Eugene Onegin*.

[RUSSL 441 Bakhtin as Reader (also RUSSL 641, COM L 641) (IV)
Spring. 4 credits. Open to undergraduates with permission of instructor. Not offered 2001–2002. P. Carden.]

[RUSSL 460 Short Works of Tolstoy and Dostoevsky # (IV)
Spring. 4 credits. Not offered 2001–2002. Staff.
Readings in Russian and in translation. Open to graduate students.]

RUSSL 491 Reading Course: Russian Literature in the Original Language
Fall or spring. 1 credit each term.
Prerequisite: permission of instructor. Staff.
This course is to be taken in conjunction with any Russian literature course at the advanced level. Students receive one credit for reading and discussing works in Russian in addition to their normal course work.

RUSSL 492 Supervised Reading in Russian Literature
Fall or spring. 1–4 credits each term. Prerequisite: permission of instructor. Independent study. Students must find an adviser and submit a plan before signing up. Staff.

[RUSSL 499 The Avant-Garde in Russian Literature and the Arts (IV)
Open to any student who has completed a second-year course in Russian, or who has equivalent reading skills in Russian. May be used in satisfaction of the 12 hours of reading required for the Russian major. Not offered 2001–2002. P. Carden.
The first decade of the twentieth century was perhaps the richest period ever in Russian literature and the arts. It began with the brilliant experimentation in poetry and prose of Andrei Bely, Blok, Remizov, and others. It continued with the breakthroughs in painting and sculpture of Malevich, Goncharova, Tatlin, etc. In the second decade the rambunctious Futurists take over in literature and establish a compact with theater and the visual arts in which all the art forms break down the barriers to produce a new kind of art. During this period Russian artists in every medium were on the cutting edge of the European art scene. After the Revolution Russian artists and writers of the avant-garde continued their dominance for a time, now including the developing medium of film.

In this course we read representative Russian texts by the major authors of the period and we also investigate developments in the theater and visual arts.]

Graduate Seminars

RUSSL 611 Supervised Reading and Research
Fall or spring. 2–4 credits. Prerequisite: permission of the department. Staff.

Related Languages

Czech

CZECH 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. Times arranged with instructor. W. Browne.
Taught on a specialized basis to address particular student needs.

Hungarian

HUNGR 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. W. Browne.
Taught on a specialized basis to address particular student needs. Times will be arranged with instructor.

[HUNGR 427 Structure of Hungarian (also LING 427) (III)
Fall. 4 credits. Prerequisite: LING 101 or equivalent. Offered alternate years. Not offered 2001–2002. W. Browne.
For description, see LING 427.]

Polish

[POLSH 131–132 Elementary Polish
131, fall; 132, spring. 3 credits each term. Prerequisite: for POLSH 132, POLSH 131 or equivalent. This language series (131–132) is not sufficient to satisfy the language requirement. Offered alternate years. Not offered 2001–2002. W. Browne.
Covers all language skills: speaking, listening comprehension, reading, and writing.]

POLSH 133–134 Continuing Polish
133, fall; 134, spring. 3 credits each term. *POLSH 134 satisifes language qualification.* Prerequisites: for POLSH 133, POLSH 132 or equivalent; for POLSH 134, POLSH 133 or equivalent. Satisfactory completion of POLSH 134 fulfills the qualification portion of the language requirement. Offered alternate years. W. Browne.
An intermediate conversation and reading course.

POLSH 300 Directed Studies
Fall or spring. 1 credit. Prerequisite: permission of instructor. Times arranged with instructor. W. Browne.
Taught on a specialized basis to address particular student needs.

Serbo-Croatian

SEBCR 131–132 Elementary Serbo-Croatian
131, fall; 132, spring. 3 credits each term. Prerequisite for SERBO 132: SERBO 131 or equivalent. This language series (131–132) is not sufficient to satisfy the language requirement. Offered alternate years. W. Browne.
Covers all language skills: speaking, listening comprehension, reading, and writing. Includes Bosnian.

[SEBCR 133–134 Continuing Serbo-Croatian
133, fall; 134, spring. 3 credits each term. *SEBCR 134 satisfies language qualification.* Prerequisites: for SERBO 133, SERBO 132 or equivalent; for SERBO 134, SERBO 133 or equivalent. Satisfactory completion of SERBO 134 fulfills the qualification portion of the language requirement. Offered alternate years. Not offered 2001–2002. W. Browne.
An intermediate conversation and reading course.]

SEBCR 300 Directed Studies
Fall or spring. 1–4 credits variable. Prerequisite: permission of instructor. W. Browne.
Taught on a specialized basis to address particular student needs. Times will be arranged with instructor.

Ukrainian

UKRAN 300 Directed Studies
Fall or spring. 1 credit. Prerequisite: permission of instructor. Times arranged with instructor. W. Browne.
Taught on a specialized basis to address particular student needs.

SANSKRIT

See Asian Studies.

SERBO-CROATIAN

See Department of Russian.

SCIENCE & TECHNOLOGY STUDIES

T. J. Pinch, chair; R. N. Boyd, P. R. Dear, M. A. Dennis, S. H. Hilgartner, R. Kline, B. V. Lewenstein, M. Lynch, H. Mialet, A. G. Power, J. V. Reppy, M. W. Rossiter. Emeritus: W. R. Lynn, L. P. Williams. Adjunct faculty: J. J. Brumberg, R. W. Miller, H. Shue, Z. Warhaft

In today's world, issues at the intersection of the technical and the social arise continually in all aspects of life. Whether one looks at the role of computers in society, the history of evolutionary theory, the challenges of environmental controversies, the ethical dilemmas of biomedicine, or the military applications of scientific research, science and technology profoundly affect our lives—often in ways that we scarcely understand or only dimly perceive. The field of science and technology studies uses tools from the history, philosophy, sociology, and politics of science and technology to examine science and technology in their social and cultural context and to explore their political and policy implications. Systematic, integrated study of the origins and impacts of science and technology provides an understanding of the interactions among science, technology, and society and yields invaluable insights into the nature of the modern world.

The Science & Technology Studies Major

The major in Science & Technology Studies offers students wishing to pursue careers in such fields as law, public policy, health care, journalism, or management an opportunity to develop a full appreciation of the place of science and technology in society. The curriculum provides a strong foundation in the historical, social, political, and ethical aspects of science and technology and prepares students to participate effectively in policy debates and decision making. S&TS courses are organized into three areas: history, philosophy, and social studies of science and technology.

Themes of the Major

Students in the S&TS major develop a program individually tailored to their particular interests. To give their coursework a coherent focus, students select a theme that draws together a group of related courses. Possible themes include:

1. *Science, Technology, and Public Policy.* Many of the most important policy issues of our time involve science and technology. This theme offers students an opportunity to gain a deep appreciation of the problems this situation raises in democratic societies. Through courses that survey the place of science in American politics and courses that focus on such substantive issues as national technology policy or the politics of genetic engineering, this theme explores the tensions between expertise and democracy, the uses of scientific knowledge in making and legitimating policy, social movements that question technology and science, and contemporary debates over economics, innovation, and technology policy.
2. *Technology, Culture, and Society.* Students interested in this theme may examine the connections between technology and society by studying the manifold ways in which social groups (scientists, engineers, inventors, corporations, government agencies, and consumers) interact to construct technological artifacts and systems, and how the use of these artifacts and systems is related to social and cultural change. Areas of particular interest are: computers and society, the military and technological change, gender and technology, genomics and society, and telecommunication policy.
3. *Environment, Science, and Society.* By focusing on the relationship between scientific knowledge and political power, this theme offers unique insights into the making and implementation of environmental policy. Courses are available on such topics as American environmental politics, international environmental policy, science and the law, the history of agricultural science, and environmental communication. Students explore the causes and consequences of environmental controversies, the nature of risk and uncertainty in environmental issues, the roles of experts and the public in environmental decisions, and the challenges of global environmental policy.
4. *History and Philosophy of Science and Technology.* This theme provides students an appreciation of science and technology in historical perspective and an understanding of the philosophical problems posed by scientific knowledge. Courses available range from broad surveys to intensive studies of focused subjects. Students in this theme address such topics as the emergence of modern science; gender and science; the goal of achieving valid knowledge and the philosophical and institutional problems that this entails; the issues for history and philosophy of science raised by the new sociology of scientific knowledge; the relationship between knowledge, technology, and ethics; and the impact of major institutions—such as religion, medicine, the military, and the modern consumer economy—on the development of the sciences.

Beyond the four themes described above, S&TS majors may also create their own themes, carefully tailored to their particular interests. Examples might include "Computers, Innovation, and Society" or "Science, Technology, and Globalization."

Admission to the Major

Students intending to major in Science & Technology Studies should submit an application during their sophomore year. Juniors are considered on a case-by-case basis. The application includes (1) a one-page statement explaining the student's intellectual interests and why the major is consistent with the student's academic interests and goals; (2) the theme the student wishes to pursue in the major; (3) a tentative plan of courses fulfilling S&TS requirements; and (4) an up-to-date transcript of work completed at Cornell University (and elsewhere, if applicable).

Acceptance into the major requires completion of the following prerequisites:

(a) two introductory courses in history, philosophy, sociology, government, anthropology, or other courses listed in the social sciences/history (Group III) requirement of the College of Arts & Sciences;

(b) the physical or biological science (Group I) requirement of the College of Arts & Sciences;

(c) mathematics or computer science courses in fulfillment of the Arts College Group II distribution requirement. These courses cannot be used to fulfill the core or other course requirements for the major and must be taken for a letter grade. Sophomores in the process of completing these prerequisites may be admitted to the major on a *provisional* basis. Further information and application materials are available at 275 Clark Hall (255–6047).

Requirements

S&TS majors must complete the following requirements:

Note: All courses used to fulfill major requirements must be taken for a letter grade.

1. Core courses: one course in each of the following groups (a-c).
   (a) History of Science and Technology: S&TS 233 (Agriculture, History, and Society), S&TS 250 (Technology in Society), S&TS 281 (Science in Western Civilization), S&TS 282 (Science in Western Civilization), or S&TS 283 (The Sciences in the Twentieth Century); and
   (b) Philosophy of Science: S&TS 381 (Philosophy of Science: Knowledge and Objectivity), or S&TS 201 (What is Science? An Introduction to Social Studies of Science and Technology); and
   (c) Social Studies of Science and Technology: S&TS 390 (Science in the American Polity: 1800–1960), S&TS 391 (Science in the American Polity: 1960–now), or S&TS 442 (Sociology of Science).
2. Additional Science and Technology Studies courses: At least 21 credit hours of additional courses in Science and Technology Studies, subject to the following restrictions:
   (a) Breadth requirement: at least one course beyond the core courses in each of the three areas of concentration (history, philosophy, and social studies of science and technology);
   (b) Depth requirement: at least two courses in one area beyond the core courses and intended for advanced undergraduates or graduate students.
3. Science Requirement: in addition to the science requirement of the College of Arts and Sciences, Science and Technology Studies majors are required to take an additional two semesters of a natural science or engineering (including computer science). Mathematics sufficient to follow the additional science requirement should be completed before undertaking that requirement. Choice of these courses should be made in consultation with the student's major adviser and should be related to the theme selected by the student.

The Honors Program

The honors program is designed to provide independent research opportunities for academically talented S&TS majors. Students who enroll in the honors program are expected to do independent study and research, with faculty guidance, on issues in science and technology studies. Students who participate in the program should find the experience intellectually stimulating and rewarding whether or not they intend to pursue a research career. S&TS majors are considered for entry into the honors program at the end of the second semester of their junior year. To qualify for the S&TS honors program, students must have an overall Cornell cumulative grade point average of at least 3.00 and a 3.30 cumulative grade point average in courses taken for the major. Additionally, the student must have formulated a research topic, and have found a project supervisor and a second faculty member willing to serve as the advisers. More information on the honors program is available from the S&TS undergraduate office at 275 Clark Hall (255–6047).

The Biology & Society Major

The Department of Science & Technology Studies also offers the Biology & Society major, which includes faculty from throughout the university. The Biology & Society major is designed for students who wish to combine the study of biology with exposure to perspectives from the social sciences and humanities. In addition to providing a foundation in biology, biology and society students obtain background in the social dimensions of modern biology and in the biological dimensions of contemporary social issues.

The Biology & Society major is offered to students enrolled in the College of Arts and Sciences, the College of Human Ecology, and the College of Agriculture and Life Sciences. The major is coordinated for students in all colleges through the Biology & Society Office. Students can get information, specific course requirements, and application procedures for the major from the office in 275 Clark Hall, 255–6047.

A full description of the Biology & Society major can be found in the Courses of Study section entitled Special Programs and Interdisciplinary Studies.

The Concentration in Science & Technology Studies

T. J. Pinch, chair; R. N. Boyd, P. R. Dear, M. A. Dennis, S. H. Hilgartner, R. Kline, B. V. Lewenstein, M. Lynch, H. Mialet, A. G. Power, J. V. Reppy, M. W. Rossiter. Emeritus: W. R. Lynn, J. P. Williams. Adjunct faculty: J. J. Brumberg, R. W. Miller, H. Shue, Z. Warhaft

The concentration (or minor) in Science & Technology Studies (S&TS) is designed for students who wish to engage in a systematic, interdisciplinary exploration of the role of science and technology in modern societies. The concentration is intended for students with varied academic interests and career goals. Majors in the natural sciences and engineering have an opportunity to explore the social, political, and ethical implications of their selected fields of specialization, while students majoring in the humanities and social sciences have a chance to study the processes, products, and impacts of science and technology from multiple disciplinary perspectives.

The S&TS concentration permits students to develop an individualized program of study closely related to their major field. For example, students might use the S&TS concentration to focus on such topics as computers and society; gender and technology; science and law; biotechnology; science and politics; and environmental policy. By choosing courses in S&TS that fit their particular goals, students can tailor the concentration to provide breadth and depth in areas of special interest.

S&TS courses are organized into three areas: history, philosophy, and social studies of science and technology. To satisfy the requirements for the S&TS concentration, students must complete with a letter grade a minimum of four courses selected from the course offerings listed for the major. At least one course should be chosen from the list of core courses. The remaining three courses should be chosen in consultation with an S&TS faculty adviser and must be drawn from at least two of the three areas. Interested students may obtain further information about courses by contacting the S&TS undergraduate office, 275 Clark Hall (255–6042).

Course Offerings

Introductory Course
History
Philosophy
Social Studies of Science
Independent Study

Introductory Course

S&TS 101 Science and Technology in the Public Arena (III)
Fall. 3 credits. J. Reppy.
An introduction to public policy issues arising from developments in science and technology. We study such topics as the politics of expertise, the effect of technical change on workers, and the management of risk. The emphasis is on understanding the way issues are framed and policy produced. We analyze selected cases, such as DNA fingerprinting, encryption on the internet, gendered design in automobiles, outbreaks of rare diseases, and nuclear waste disposal.

History

[S&TS 233 Agriculture, History, and Society: From Squanto to Biotechnology (III)
Fall. 3 credits. Not offered 2001–2002. M. W. Rossiter.
This course surveys the major themes in the development of agriculture and agribusiness in the United States in the nineteenth and twentieth centuries. These include particular individuals (such as Liberty Hyde Bailey, Luther Burbank, G. W. Carver, Henry A. Wallace, and Norman Borlaug), the rise of government support and institutions (including U.S.D.A. and Cornell), noteworthy events (the Dust Bowl, World War II, and the environmental movement), and the achievements of the recent Green and "Gene" Revolutions.]

S&TS 250 Technology in Society (also ECE 250 and HIST 250) (III)
Fall. 3 credits. R. R. Kline.
For description, see ENGRG 250.

S&TS 281 Science in Western Civilization (also HIST 281) # (III)
Fall. 4 credits. P. R. Dear.
For description, see HIST 281.

S&TS 282 Science in Western Civilization (also HIST 282) # (III)
Spring. 4 credits. P. R. Dear.
For description, see HIST 282.

[S&TS 283 The Sciences in the Twentieth-Century (also HIST 280) (III)
Spring. 4 credits. Not offered 2001–2002. M. Dennis.
Science emerged as a powerful source of social, economic, and political power during the twentieth century. Through an examination of the development of the sciences—physical and biomedical—during the twentieth century students learn about the reciprocal relations between science and society. Topics covered may include: the rise and development of quantum mechanics; the emergence of Big Science; the history of the sciences in totalitarian nations, especially the former Soviet Union, Nazi Germany, and Communist China; the evolutionary synthesis; the rise and fall of molecular biology; the multiple forms of eugenics; the transformation of the social sciences; the role of new technologies in scientific change, especially computer and communication technology; the growth of science as a profession; and the development of science in non-western cultures.]

S&TS 287 Evolution (also BIOEE 207 and HIST 287) (I or III)
Fall. 4 credits. W. Provine.
For description, see BIOEE 207.

S&TS 292 Inventing an Information Society (also ECE 298 and ENGR 298 and HIST 292) (III)
Spring. 3 credits. R. R. Kline.
For description, see ENGRG 298.

S&TS 355 Computers: From Babbage to Gates (III)
Fall. 4 credits. M. Dennis.
Computers have not always been the ubiquitous beige boxes gracing our desktops: in Victorian London, Charles Babbage attempted to build his analytical engine using brass gears and steel rods; and during World War II the Allied governments used sophisticated electro-mechanical and electronic "brains" to break Axis codes. Machines that once occupied entire rooms now travel in knapsacks. How did this technology, once considered esoteric and useful to only technical specialists, colonize industry, academia, the military, the federal government, and the home? Using primary historical materials, including novels, films, archival documents, and other texts we follow computers from Babbage's Victorian dream of an analytical engine to the visions of contemporary moguls like Bill Gates whose goal is "information at your fingertips." We explore not only how computer technology affects society, but how culture and politics enable and sustain the development of the machine. This is a course in the history and sociology of computers; a background in computer science is not required. (No technical knowledge of computer use is presumed or required.)

[S&TS 433 International History of Science (III)
Spring. 4 credits. Not offered 2001–2002. M. W. Rossiter.
A survey of the major scientific events and institutions in several foreign nations, including developing countries. The course covers the period 1660 to the present and gives some attention to who in each country becomes a scientist, who rises to the top, and who emigrates. Weekly readings and a research paper.]

S&TS 444 Historical Issues of Gender and Science (also WOMNS 444) (III)
Spring. 4 credits. Open to sophomores. M. W. Rossiter.
One-semester survey of women's role in science and engineering from antiquity to the 1980s, with special emphasis on the United States in the twentieth century. Readings include biographies and autobiographies of prominent women scientists, educational writings and other primary sources, and recent historical and sociological studies. By the end of the semester, we shall have attained a broad view of the problems that have faced women entering science and those that still remain.

S&TS 447 Seminar in the History of Biology (also B&SOC 447, HIST 415, and BIOEE 467) (I or III)
Fall and summer. 4 credits. Limited to 18 students. S-U grades optional. W. B. Provine.
For description, see BIOEE 467.

S&TS 473 Knowledge and Politics in Seventeenth Century England (also HIST 471) (III)
Spring. 4 credits. Limited to 15 students. P. Dear and R. Weil.
England in the 17th century was a revolutionary ferment of political, religious, and philosophical conflict. This course examines the conflicts and arguments, and the means explored for their apparent resolution. These affected ideas of God and worship, the meanings of gender, conceptions of the natural world and its scientific appropriation, and the legitimacy and proper form of political power. The course focuses on the close study of primary source readings by many of the principal players in all these areas, including Francis Bacon, Thomas Hobbes, the Duchess of Newcastle, and John Locke.

[S&TS 487 Seminar in the History of the Environment (III)
Spring. 4 credits. Next offered spring 2003. M. W. Rossiter.
This course is a one-semester survey of the general topic of the history of the environmental sciences, broadly defined, but mostly in the United States. Depending on the interests of the students, its topics may include clean water, clean air, the great outdoors, environmental disasters, and wildlife.]

S&TS 525 Seminar in the History of Technology (also HIST 525)
Spring. 4 credits. R. R. Kline.
An exploration of the history of technology in Europe and the United States from the eighteenth century to the present. Typical topics include the industrial revolution in Britain, the emergence of engineering as a profession, military support of technological change, labor and technology, the "incorporation" of science and engineering, technological utopias, cultural myths of engineers and inventors, social aspects of urbanization in the city and on the farm, post-war consumerism, and gender and technology. The interests of students and recent literature in the field are considered in selecting the topics for the seminar.

[S&TS 616 Enlightened Science (also HIST 616)
Fall. 4 credits. Limited to graduate students. Not offered 2001–2002. P. R. Dear and M. Dennis.
For description, see HIST 616.]

[S&TS 644 Topics in the History of Women in Science (also WOMNS 644)
Spring. 4 credits. Not offered 2001–2002. M. W. Rossiter.
This is a one-semester graduate seminar on selected topics in the history of women and gender in science and technology, covering mostly the U.S. in the 20th century but broadly defined to include earlier periods and other countries. It seeks to acquaint advanced students with some of the best recent literature on this topic and to identify and explore possible new topics. Weekly readings and a research paper.]

[S&TS 680 Seminar in Historiographical Approaches to Sciences (also HIST 680)
Fall. 4 credits. Not offered 2001–2002. P. R. Dear.
For description, see HIST 680.]

[S&TS 682 Topics in the Scientific Revolution (also HIST 682)
Fall. 4 credits. Not offered 2001–2002. P. R. Dear.
For description, see HIST 682.]

[S&TS 777 Science, Technology, and the Cold War
Fall. 4 credits. Permission of instructor required for undergraduate students. Next offered fall 2002. M. Dennis.
This graduate seminar examines the historical transformation wrought in the organization and practice of the physical, biomedical, and environmental sciences since 1945. How did military and federal patronage affect the development of the sciences, the organization of the postwar university, and the armed services? Students read contemporary historical materials as well as primary texts to understand the development of particular institutions, technologies, and individuals. In addition to participation in the weekly discussion, each student prepares a research paper for presentation to the seminar.]

Philosophy

S&TS 201 What is Science? An Introduction to the Social Studies of Science and Technology (also SOC 210) (III)
Spring. 3 credits. T. Pinch.
For description, see listing in Social Studies of Science.

S&TS 205 Ethical Issues in Health and Medicine (also B&SOC 205) (IV)
Fall. 4 credits. E. Toon.
For description, see B&SOC 205.

S&TS 206 Ethics and the Environment (also B&SOC 206 and PHIL 246) (IV)
Spring. 4 credits. N. Sethi.
For description, see B&SOC 206.

S&TS 286 Science and Human Nature (also PHIL 286) (IV)
Spring. 4 credits. R. N. Boyd.
For description, see PHIL 286.

S&TS 381 Philosophy of Science: Knowledge and Objectivity (also PHIL 381) (IV)
Fall. 4 credits. R. N. Boyd.
For description, see PHIL 381.

[S&TS 681 Philosophy of Science (also PHIL 681)
Spring. 4 credits. Not offered 2001–2002. R. N. Boyd.
For description, see PHIL 681.]

Social Studies of Science

S&TS 201 What is Science? An Introduction to the Social Studies of Science and Technology (also SOC 210) (III)
Spring. 3 credits. T. Pinch.
This course allows both science and nonscience majors to reflect a little on the nature of science and technology as activities. Why is science so successful? Has it always been that way? How different is science from other activities? How does a new invention come about?

In order to understand better what science is we look at what it is not. We also look at episodes of mainstream science along side science from science fiction. Throughout, we look at the infrastructure of science and technology—the bits that scientists, engineers, and their textbooks take for granted. No particular science or arts requirements are needed for this course. The materials are chosen so as to be understandable by all. We will use a variety of media, including still images, video, and computer simulations.

S&TS 285 Communication in the Life Sciences (also COMM 285) (III)
Spring. 3 credits. Staff.
For description, see COMM 285.

S&TS 311 Sociology of Medicine (III)
Spring. 4 credits. E. Toon.
This course provides an introduction to the ways in which medical practice, biomedical technology, and the medical profession are embedded in society and shaped by social phenomena. Accountability to patients and the public, and struggles over the control of medical practice in a world where medicine is connnected to gender, class, race, and personal autonomy are important overarching themes. We examine the structure of the medical profession; medical training and professional socialization; the social organization of the hospital; and doctor-patient interactions. The course also explores how biomedical knowledge and technology get produced, assessed, and introduced into clinical practice. Topics may include the intensive care unit, the training of surgeons, the regulation of pharmaceuticals, AIDS and breast cancer activism, genetic testing, and priority setting in biomedical science.

S&TS 324 Environment and Society (also R SOC 324 and SOC 324) (III)
Spring. 3 credits. L. Glenna.
For description, see R SOC 324.

[S&TS 350 Atomic Consequences: The Incorporation of Nuclear Weapons in Postwar America (also GOVT 305, AM ST 350) (III)

Spring. 4 credits. Not offered 2001–2002. M. Dennis.

This course explicates the development of atomic weapons from early twentieth-century ruminations about super bombs in science fiction through the Manhattan Project, the postwar development of thermonuclear weapons and civil defense, and more recent plans for strategic defense. Our focus expands to cover the lives of researchers at such institutions as Los Alamos during and after World War II as well as discussions of national politics. Other topics include the Nazi effort to develop an atomic bomb, the role of technical espionage during and after World War II, and the problems posed by the classification of technical knowledge. We seek to understand how the bomb became part of American culture through the use of literature and film, as well as readings in primary historical documents and secondary analyses. In addition to class meetings, there is also a required screening session. Films generally last less than two hours, but some are longer. Viewing the movies is an essential part of the course.]

S&TS 352 Science Writing for the Mass Media (also COMM 352) (III)

Fall. 3 credits. B. Lewenstein.

For description, see COMM 352.

S&TS 353 Knowledge and Society (also SOC 353) (III)

Spring. 3 credits. C. Leuenberger.

For description, see SOC 353.

[S&TS 360 Ethical Issues in Engineering (also ENGR 360) (III)

Spring. 3 credits. Not offered 2001–2002. R. Kline.

For description, see ENGR 360.]

[S&TS 390 Science in the American Polity, 1800–1960 (also GOVT 308, AM ST 388) (III)

Fall. 4 credits. Not offered 2001–2002. M. Dennis.

How did America become a leading nation in scientific and technical research? This course charts the development of American science from its origins in gentlemanly societies in the early nineteenth century through the development of large-scale federally funded research or Big Science. Particular attention is paid to the importance of government patronage in creating new social and intellectual spaces for research; the importance of medicine and the biomedical disciplines for the development of university-based research; the origins and expansion of research in corporations; and the role of war in the political economy of American science.]

S&TS 391 Science in the American Polity, 1960–Now (also GOVT 309, AM ST 389) (III)

Fall. 4 credits. M. Dennis.

This course reviews the changing political relations between science, technology, and the state in America from 1960 to the present. It focuses on the politics of choices involving science and technology in a variety of institutional settings, from Congress to courts and regulatory agencies. The tensions and contradictions between the concepts of science as an autonomous republic and as just another special interest provide the central theme for the course. Topics addressed include research funding, technological controversies, scientific advice, citizen participation in science policy, and the use of experts in courts.

S&TS 400 Components and Systems: Engineering in a Social Context (also M&AE 400) (III)

Spring. 3 credits. Z. Warhaft.

For description, see M&AE 400.

S&TS 401 Biology and Society: The Social Construction of Life (also B&SOC 301) (III)

Fall. 4 credits. E. Toon.

For description, see B&SOC 301.

S&TS 406 Biotechnology and Law (also B&SOC 406) (III)

Spring. 4 credits. L. Palmer.

Biotechnology, with myriad applications in areas such as medicine and agriculture, is creating many challenges for basic social institutions. This course explores the use and potential abuse of biotechnology in areas such as genetic screening and counseling, reproductive technologies, intentional release of genetically engineered organisms, patents, and ownership of human tissue. Particular attention will be given to evolving legal and management strategies for regulating the applications of biotechnology. Readings are from science, medicine, law, and public policy. Several short written asignments as well as a research paper are required.

[S&TS 407 Law, Science, and Public Values (also GOVT 407 and B&SOC 407) (III)

Spring. 4 credits. Not offered 2001–2002. M. Lynch.

This course examines problems that arise at the interface of law and science. These problems include the regulation of novel technology, the role of technical expertise in public decision making, and the control over scientific research. The first part of the course covers basic perspectives in science and technology studies (S&TS) and how they relate to legal decisions and processes. The second part of the course covers a series of examples and legal cases on the role of expert judgments in legal and legislative settings, intellectual property considerations in science and medicine, and legal and political oversight of scientific research. The final part of the course examines social processes and practices in legal institutions, and relates these to specific cases of scientific and technological controversy. Lectures and assignments are designed to acquaint students with relevant ideas about the relationship between legal, political, and scientific institutions, and to encourage independent thought and research about specific problems covered in the course.]

S&TS 409 From the Phonograph to Techno (also SOC 409) (III)

Fall. 4 credits. Limited to 15. Permission of the instructor. T. Pinch.

In this seminar, we treat music and sound and the ways they are produced and consumed as socio-cultural phenomena. We specifically investigate the way that music and sounds are related to technology and how such technologies and sounds have been shaped by and have shaped the wider society and culture of which they are a part. We look at the history of sound technologies like the phonograph, the electronic music synthesizer, samplers, and the Sony walkman. Our perspective is drawn from social and cultural studies of science and technology. Students are encouraged to carry out a small original research project on their own favorite sound technology.

S&TS 411 Knowledge, Technology, and Property (III)

Spring. 4 credits. Prerequisites: at least 1 course in science and technology studies. S. Hilgartner.

Should the human genome be treated as private property or a public resource? How should copyright be managed in the digital environment of the Internet? Is music "sampling" high-tech theft or artistic expression? Does bioprospecting represent an enlightened strategy for preserving biodiversity or a post-colonial means for transferring resources from the developing world to the North? Debate about the nature and scope of intellectual property is an increasingly salient feature of contemporary politics. This course examines the ownership of knowledge and technology, exploring fundamental tensions that intellectual property systems express and incompletely reconcile. Perspectives from science and technology studies, sociology, law, and economics inform the course. Case studies explore the construction of property in contexts ranging from the early history of copyright to the ownership of life forms, airwaves, algorithms, artistic content, electronic databases, and the personal identities of celebrities.

[S&TS 427 Politics of Environmental Protection in America (also GOVT 427) (III)

Fall. 4 credits. Not offered 2001–2002. Staff.

An introduction to the distinctive feature of environmental protection in America, focusing particularly on the role of law, science, and citizen activism in public policymaking. Readings from law, political science, and policy analysis examine the changing role of expert agencies, courts, public interest groups, Congress, and the states in environmental politics since the late 1960s. Case studies of specific environmental controversies (nuclear power, siting, pesticides, endangered species) are used to explore dominant public conceptions of risk and safety, regulatory costs and benefits, and the goals and instruments of environmental policy.]

[S&TS 438 Minds, Machines, and Intelligence (also COGST 438) (III)

Spring. 4 credits. Not offered 2001–2002. H. Mialet.

Do machines think? Do they have minds? Are they intelligent? What can humans do that machines cannot do and vice versa? How do humans use machines and how do machines use humans? In this course we focus on how philosophers such as Turing, Searle, and Dreyfus have dealt with these questions. At the same time, however, we are also concerned with trying to rework the themes raised by these thinkers. We do this with an eye toward the work of social scientists who have studied how people and machines interact in specific contexts, as for example, in a plane's cockpit or on the Internet. Topics may also include virtual surgery, speech recognition, and expert systems in medicine.]

S&TS 442 The Sociology of Science (also CRP 442, B&SOC 342, and SOC 442) (III)

Fall. 4 credits. T. Pinch.

A view of science less as an autonomous activity than as a social institution. We discuss such issues as controversies in science,

analysis of scientific text, gender, and the social shaping of scientific knowledge.

[S&TS 453 Reflections on Scientific Personae: Visibility and Invisibility of the Body (III)
Spring. 4 credits. Not offered 2001–2002. H. Mialet.
Who produces science? Rational, deliberative minds or brilliant, intuitive iconoclasts? Individuals or groups? Geniuses or ordinary practitioners? Human beings or assemblages of instruments? This course explores the question of where scientific intelligence resides. The mythical figure of the lone genius stands in sharp contrast to recent work in the social history and sociology of science that analyzes how scientific knowledge is produced in collectivities that weave together humans and nonhumans. We examine the process through which scientific competencies emerge from, and are incorporated into, "collective bodies" (e.g., Callon and Latour's "actor-networks," or Haraway's "cyborgs"). The tensions between the human and the nonhuman and the individual and the collective run throughout the course and inform our analysis of the place, the role, and the representation of the body—or bodies—of the scientist.]

[S&TS 466 Public Communication of Science and Technology (III)
Fall. 4 credits. Limited to 15. Not offered 2001–2002. B. Lewenstein.
For description, see COMM 466.]

[S&TS 467 Innovation: Theory and Policy (III)
Fall. 4 credits. Open to upper-level undergraduates and interested graduate students. Prerequisite: ECON 102 or permission of the instructor. Not offered 2001–2002. J. Reppy.
In this course we study the innovation process (that is, the introduction of new technology into practice) through the critical analysis of selected theories of innovation and supporting empirical evidence. Economic theories are contrasted to the insights found in science and technology studies. The focus is on the context of interests and ideology in which the various theories have been framed and their differing implications for technology policy. Authors covered include Schumpeter, Solow, Scherer, Nelson and Winter, and Bijker and Pinch.]

[S&TS 469 Food, Agriculture, and Society (also B&SOC 469, and BIOEE 469) (I)
Spring. 3 credits. Not offered 2001–2002. A. Power.
For description, see BIOEE 469.]

S&TS 483 The Military and New Technology (III)
Fall. 4 credits. J. Reppy.
For description, see GOVT 483.

[S&TS 490 The Integrity of Scientific Practice (III)
Fall. 4 credits. Next offered fall 2002. S. Hilgartner.
Recent scandals over scientific fraud, debates about financial conflicts of interest, disputes about the use of human and animal subjects, and tensions over ownership of data have raised concern about integrity in science. In addition, changes in the American research system—from the emergence of new university-industry relationships to the growth of electronic communication—pose new questions about who owns and controls research. This course addresses practices that present problems of integrity in research (e.g., fraud, secrecy, commercialization). It also examines how scientific practices affect the structural integrity of science as an institution. Through these complementary concepts of integrity, the course explores the connections between the conduct of science and its cultural authority.]

S&TS 492 Politics and the Public Health (III)
Spring. 4 credits. E. Toon.
Who is responsible for the public's health? Both now and in the past, the answer to that question has been a source of bitter debate. In the past three centuries, public health has become a contested mix of aims, advocates, and practices: it is simultaneously a field of scientific activity, a vehicle for social reform, and a site of political controversy. This course examines the history of American public health, with an eye to understanding how public health has been defined and how responsibility for the public's health has been apportioned. Course readings and discussions focus on the evolution of this balance of science, reform, and politics in the United States, but include some material on public health in other national and cultural contexts.

[S&TS 493 Economics Meets Science Studies (III)
Spring. 4 credits. Not offered 2001–2002. J. Reppy.
This course covers a variety of possible interactions between the disciplines of economics and science and technology studies. Economists (at least some economists) are interested in science and technology as important components in economic growth, while scholars in science studies often appeal to economic motives and institutions to explain behavior in the production of scientific and technological knowledge. We explore ways in which economics can provide new questions and theoretical approaches for science and technology studies. From another perspective, economics, as the most "scientific" of the social sciences, is itself a subject for study. Internal critiques by economists are compared to external analyses in the science studies literature. Readings include works on the epistemology and us of economic analysis in the science studies literature.]

[S&TS 532 Inside Technology: The Social Construction of Technology (also SOC 532)
Spring. 4 credits. Next offered spring 2003. T. J. Pinch.
Rather than analyze the social impact of technology on society, in this course we investigate how society gets inside technology. In other words, is it possible that the very design of technologies embody assumptions about the nature of society? And, if so, are alternative technologies possible which embody different assumptions about society? Do engineers have implicit theories about society? Is technology gendered? How can we understand the interaction of society and technology? Throughout the course the arguments are illustrated by detailed examinations of particular technologies, such as the ballistic missile, the bicycle, the electric car, and the refrigerator.]

[S&TS 625 Visualization and Discourse in Science
Fall. 4 credits. Not offered 2001–2002. M. Lynch.
This seminar covers two interrelated areas of science and technology studies: visualization and discourse. Visualization refers to the practices and technologies through which scientists and designers develop images, graphs, models, and other representations. Discourse refers, broadly, to practical uses of language. In the context of this course, discourse and visualization are treated as important aspects of the production of scientific data and technological artifacts. The course focuses mainly on historical and ethnographic studies that pay close attention to the material practices and linguistic repertoires through which scientific and technological innovations are made visible, palpable, and intersubjectively accountable.]

[S&TS 631 Qualitative Research Methods for Studying Science (also SOC 631)
Fall. 4 credits. Not offered 2001–2002. P. R. Dear.
Much has been learned about the nature of science by sociologists and anthropologists donning lab coats and studying scientists in action. In this course we look at the methods used in this new wave of science studies. We examine what can be learned by interviewing scientists, from videos, and from detailed examinations of scientific texts. Students gain hands-on experience by conducting a mini-project in which they investigate some aspect of scientific culture.]

S&TS 645 Genetics: Politics and Society in Comparative Perspective (also GOVT 634)
Spring. 4 credits. Limited to seniors and graduate students. S. Hilgartner.
Contemporary genetics and biotechnology are highly controversial, creating high hopes for some and deep anxieties for others. This course traces the conflicts and power struggles over genetic engineering, using it as a case to examine some crucial issues in the relationships among science, technology, and politics. In particular, the course focuses on three themes—the politics of property, the politics of identity, and the politics of risk—as they pertain to genetics. Topics may include the social shaping of biological research; eugenics and genetics; genetics and medicine; the regulation of risks; the growth of commercial biotechnology; university-industry relationships; Green parties and social movements; North-South issues and biotechnology; the Human Genome Project; intellectual property and patenting genes; and the debate over human cloning.

[S&TS 664 Constructionism in Social Science
Spring. 4 credits. Next offered spring 2003. M. Lynch.
Constructionist approaches have become commonplace in many fields of social and cultural study. The very words 'social construction' often provoke heated arguments, but exactly what these words mean or imply is seldom made clear. This course examines philosophical arguments, counterarguments, and empirical case studies associated with constructionism. The main focus is on constructionist approaches in the sociology of knowledge and science and technology studies, but other variants in sociology, psychology, and the humanities are also discussed. The aim is to develop a critical understanding of the arguments, narratives, and concepts that inform and identify these approaches.]

[S&TS 700 Special Topic 1: Science Studies and the Politics of Science
Fall. 4 credits. Prerequisites: S&TS 711 or permission of the instructor. Not offered 2001–2002.
Theoretical developments in science and technology studies have called attention to the contingent and socially embedded character of both knowledge claims and technological systems. Drawing on literature from several disciplines, this seminar explores the consequences of these findings for social and political studies of science. Issues and problems considered include trust and skepticism, political and legal agency, reflexive institutions, relativism and social action, science and norms, and the co-production of knowledge and social order.]

S&TS 700 Special Topic 2: Technology Transfer Issues
Spring. 4 credits. J. Reppy.
The goal of this course is to develop a coherent analytical framework for analyzing technology transfer, using insights from economics, sociology, history, and science and technology studies and to employ that framework to evaluate current policy issues. We study the process of technology transfer in different contexts, ranging from intra-firm and intra-industry to technology transfer between civil and military sectors, and between industrialized countries and LDCs. The readings will include a mix of theoretical writings and case studies.

S&TS 700 Special Topic 3: Issues in the Social and Cultural History of Technology (also HIST 700)
Fall. 4 credits. R. Kline.
This seminar focuses on different issues in the social and cultural history of technology. Students discuss readings in the first half of the course, then give presentations on their research papers. The topic for fall 2001 is Gender and Technology. We critique how scholars have examined this issue in the past decade.

S&TS 711 Introduction to Science and Technology Studies (also HIST 711)
Fall. 4 credits. P. R. Dear.
This introductory course provides students with a foundation in the field of science and technology studies. Using classic works as well as contemporary exemplars, seminar participants chart the terrain of this new field. Topics for discussion include, but are not limited to: historiography of science and technology and their relation to social studies of science and technology; laboratory studies; intellectual properties; science and the state; the role of instruments; fieldwork; politics and technical knowledge; philosophy of science; sociological studies of science and technology; and popularization.

Independent Study

S&TS 399 Undergraduate Independent Study
Fall or spring. 1–4 credits. No more than 8 hours total of independent study (not including honors) can count toward the S&TS major.
More information and applications are available in 275 Clark Hall.

S&TS 498–499 Honors Project I & II
Fall and spring. 3–5 credits each term. Open only to Science & Technology Studies students in their senior year by permission of the department. Applications and information available in 275 Clark Hall.
Students who are admitted to the honors program are required to complete two semesters of honors project research, and to write an honors thesis. The project must include substantial research and the completed work should be of wider scope and greater originality than is normal for an upper-level course.

Students may take three to five credits per semester up to a maximum of eight credits in S&TS 498 & 499, Honors Projects I & II. Students should note that these courses are to be taken in addition to those courses that meet the regular major requirements. S&TS 498 includes the fall Honors Seminar. The student and the project supervisor must reach clear agreement at the outset as to what sort of work will need to be completed during the first semester. Minimally, an honors thesis outline and bibliography should be accomplished. At the end of S&TS 498, Honors Project I, a letter grade is assigned and the advisers, in consultation with the Director of Undergraduate Studies, evaluate whether or not the student should continue working on an honors project. S&TS students who do continue in the honors program for the second semester receive a letter grade at the end of their final term whether or not they complete a thesis and whether or not they are recommended for honors.

S&TS 699 Graduate Independent Study
Fall or spring. 2–4 credits.
Applications andd information are available in 275 Clark Hall.

SINHALA (SINHALESE)

See Department of Asian Studies.

SOCIOLOGY

P. Becker, M. Brinton, S. Caldwell, M. Clarkberg, R. Grannis, D. Grusky, D. Heckathorn, E. Lawler, C. Leuenberger, M. Macy, P. Moen, S. Morgan, V. Nee, T. Pinch, D. Strang, S. Szelényi, S. Tarrow, K. Weeden, E. Wethington

Emeritus: D. Hayes, B. C. Rosen, R. M. Williams, Jr.

Sociology is the study of human social organization, institutions, and groups. The Department of Sociology offers courses in a number of key areas, including: comparative sociology, culture, economy and society, family and the life course, political behavior and public policy, organizations, rational choice, social inequality, social psychology and group processes, social and political movements, and social networks. A particular emphasis of the department is the linkage of sociological theory to issues of public concern such as ethnic conflict, drugs, poverty, and gender and race segregation. Interests of faculty members range from the study of interaction in small groups to the study of economic and social change in a number of different countries. The department offers the opportunity for students to develop fundamental theoretical insight and understanding as well as advanced research skills in quantitative and qualitative methods. Graduates of the department take up careers in university, government, and business settings, and enter professions such as law, management, urban policy, and others that seek men and women who demonstrate a disciplined understanding of society and complex social issues.

Sociology Courses for Nonmajors

Sociology provides students with particularly effective ways to understand the complexities of modern life. For many students, the undergraduate years are a last opportunity to gain the insights these fields have to offer. The Department of Sociology is continuing to design an array of beginning and advanced courses that convey a broad understanding of the methods and insights of sociological analysis—courses that will be of particular interest to undergraduates who may not major in sociology. First- and second-year students should note that the introductory courses (101, 103, 105, 108, 115, and 165) focus on the sociological analysis of major issues of public life, and that a wide selection of general education courses is available at the 200 level. Advanced undergraduates who are majors in other fields should also see, in particular, descriptions of the 300- and 400-level courses, for which there are no prerequisites other than junior or senior status.

Related Courses in Other Departments

Students interested in sociology should consult the course lists of the other social science departments in the College of Arts and Sciences (including Anthropology, Economics, Government, and Psychology) and of the following departments in other colleges: Organizational Behavior (College of Industrial and Labor Relations), Human Development (College of Human Ecology), and Rural Sociology (College of Agriculture and Life Sciences).

The Sociology Major

The Department of Sociology is one of the social science departments at Cornell with the highest national ranking. Faculty members are internationally recognized for their scholarly work, and have received numerous awards, research fellowships, and research grants.

The sixteen or so professors who are currently in the department are dedicated to scholarly inquiry that is both methodologically rigorous and theoretically innovative. The breadth of their substantive interests and the variety of their methodological styles are well demonstrated in the different fields that are represented within the department. These include: comparative societal analysis, culture, deviance and social control, education, economic sociology, family, gender, inequality, social networks, organizations, political sociology, public policy, race and ethnic relations, religion, science and technology, social movements, and social psychology.

Career Opportunities for Graduates

An undergraduate degree in sociology is one of the most popular degrees with employers. After engineering and computer science, sociology is the most able to place graduates into jobs immediately after completing their Bachelor's Degree. This is not altogether surprising, since sociology can lead to a rewarding career in any of the following fields:

- **government:** urban/regional planning, affirmative action, foreign service, human rights management, personnel management
- **research:** social research, consumer research, data analysis, market research, survey research, census analysis, systems analysis
- **criminal justice:** corrections, criminology assistance, police work, rehabilitation counseling, criminal investigation, parole management
- **teaching:** public health education, school admissions, college placement
- **community affairs:** occupational counseling, career counseling, public health administration, hospital administration, public administration, social assistance advocacy, fund-raising, community organizing, social work
- **business:** advertising, sales, project management, sales representation, market analysis, real estate management, journalism, public relations, insurance, human resource management, production management, labor relations, quality control management

A large number of our majors also go onto graduate school and obtain advanced (i.e., Master's and Ph.D.) degrees in such varied fields as sociology, political science, philosophy, economics, and psychology. Many also complete professional degrees in education, law, social work, and business administration.

Requirements for the Major

In addition to the academic requirements established by the College of Arts and Sciences, you must also fulfill requirements towards a specified major. There are 10 courses required in the sociology major. All courses towards the major must be taken for a letter grade and students must maintain at least a 2.0 grade point average while enrolled in the major. The 10 courses required for the major are divided into the following categories:

- Sociology 101
- one additional introductory-level course in sociology (at the 100- or 200-level)
- two research methods courses (SOC 301 *and* 303)
- one advanced-level sociology course (400-level or higher)
- five additional (i.e., elective) courses in sociology

Declaring the Sociology Major

If you are a student in the College of Arts and Sciences and wish to declare a major in sociology, it is in your best interest to do so as soon as possible. If you are *not* currently in the College of Arts and Sciences, you need to be admitted to A&S *before* you can declare. In order to declare the sociology major, you need to take the following steps:

- Obtain a **campus copy** of your transcript from Day Hall and bring it to the department office (311 Uris Hall).
- Make an appointment for advising with the Undergraduate Coordinator, Heather Gowe, or visit her during her office hours (in 311 Uris Hall). During your meeting with her, you will fill out a major declaration form.
- Leave this form and your transcript with the Undergraduate Coordinator. Your declaration will be reviewed by the Director of Undergraduate Studies, Szonja Szelényi, and sent on to the College of Arts and Sciences for official notification that you have declared a major. Please allow two weeks for your declaration to be approved and entered into the campus computer.

A student file will be set up to maintain your records in the department. Once you are officially recognized as a major in sociology, the Sociology Department will receive a copy of your transcript at the end of each semester, which will be kept in your student file at 311 Uris Hall. Your records will be maintained until five years after you graduate.

Academic Advising in Sociology

As a student at Cornell, you are ultimately responsible for the policies, procedures, and requirements regarding your degree as stated in the current *Courses of Study*. After reading this document, you may find that you are still confused or unclear about some of the requirements, and you may have questions and concerns that pertain to your individual situation. Several sources of academic assistance and advice are available to you.

College Adviser: As a sociology major, you are a student in the College of Arts and Sciences. For assistance and advice, College Advisers are available to you by appointment in the Office of Undergraduate Admissions and Academic Advising (Goldwin Smith Hall). It is recommended that you consult with a College Adviser sometime before your last semester to discuss the completion of College requirements, graduation, and residency requirements.

Undergraduate Program Coordinator: The Undergraduate Program Coordinator (Heather Gowe) in the Sociology Department is located in Room 311, Uris Hall. She is available to provide assistance with the following:

- the process of declaring the sociology major.
- forms relating to transferring courses from other universities and/or other departments.
- other administrative matters or concerns (e.g., forms, adding and dropping courses).

Director of Undergraduate Studies: The Director of Undergraduate Studies (Szonja Szelényi) is located in Room 346, Uris Hall. She is there to:

- provide information about departmental curricula and the requirements for the major.
- meet with applicants to the major.
- review applications for sociology majors and accept students into the program.
- assist students in finding an advisor in the sociology department.
- screen sociology classes taken outside Cornell for acceptance as Cornell credit.
- serve as the backup for faculty advisers who are absent during advising periods.

Faculty Advising: Once you are a declared sociology major, you will be assigned a faculty advisor within the Sociology Department. When you declare sociology as a major, you will be asked to name your preference for an adviser; however, if you are not sufficiently familiar with the program, the Director of Undergraduate Studies can assist you in selecting a faculty member to work with you. Faculty advisers are there to:

- discuss your education, career goals, and graduate school opportunities.
- meet with you to talk about courses and plan your program of study within the department.
- go over your academic program each semester and provide you with your Personal Identification Number (PIN) so that you can register for courses via the campus computer.

Sociology Peer Advisers: There are approximately 10 advanced sociology majors who serve as peer advisers in the department. These advisers change from year to year, but a complete list of their names and email addresses is available to you from the Undergraduate Program Coordinator in the sociology office (Room 311, Uris Hall). Peer advisers do not provide you with academic counseling; they are there to help you adjust to life in the major, as well as to let you know about the department's many support services and activities.

Research Opportunities

Qualified sociology majors are invited to participate with faculty members in conducting research. Such projects are usually initiated in one of two ways: the student may offer to assist the faculty member in an ongoing project, or the student may request that the faculty member supervise the execution of a project conceived by the student. In either case, the student should enroll in SOC 491 (Independent Study). Interested students may direct inquiries to any faculty member.

The Sociology Honors Program

Honors in sociology are awarded for excellence in the major, which includes overall grade point average and completion of an honors thesis. In addition to the regular requirements of the major, candidates for honors must maintain a cumulative grade point average of at least a B+ in all sociology classes, complete at least 2 credits of SOC 491 (in the junior year), complete SOC 495 and SOC 496 (in the senior year), and write an honors thesis.

Students are awarded either honors (*cum laude*), high honors (*magna cum laude*), or highest honors (*summa cum laude*) in the program based on the honors advisers' evaluation of the level and the quality of the work completed towards the honors degree.

The honors distinction will be noted on the student's official transcript and it will also be indicated on the student's diploma.

Admission to the Honors Program

To qualify for entrance into the honors program, students must have at least a B grade point average overall and a B+ grade point average in the major. In addition, they must secure the consent of a faculty member in the Sociology Department who will guide their honors thesis.

Students who wish to be considered for honors should apply to the Director of Undergraduate Studies no later than the second term of their junior year. Honors program application forms are available in 311 Uris Hall. The application must include a copy of the student's undergraduate transcript, a brief description of the proposed research project, and the endorsement of a faculty member in the Sociology Department.

The Honors Thesis

During the senior year, each candidate for honors in sociology enrolls in a year-long tutorial (SOC 495 and SOC 496) with the faculty member who has agreed to serve as the student's thesis adviser. During the first term of their senior year, students determine the focus of their honors thesis, and submit a 10- to 15-page overview (or, alternatively, a preliminary draft) of the thesis to their adviser. During the second term, they complete their honors thesis and submit final copies to the department.

The text of the honors thesis may not exceed 60 pages except by permission of the honors adviser. Two copies of the honors thesis are due to the Undergraduate Program Coordinator (311 Uris Hall) during the third or fourth week of April. One of these copies will go to the student's thesis adviser and the other will remain on file in the department.

Any honors candidate whose research directly involves working with human subjects must receive approval for the project from the Cornell University Committee on Human Subjects.

Business and Organizational Studies Concentration

Majors who wish to prepare for postgraduate study in professional schools (business, management, or law) or a career in business or nonprofit organizations may elect to acquire a concentration in Business and Organizational Studies in sociology. This program provides Cornell students with training in economic sociology, organizational studies, and comparative societal analysis, all of which are useful areas of expertise in a world increasingly shaped by economic and social forces of a truly global dimension. In order to complete a concentration in Business and Organizational Studies, students must meet the following requirements:

- complete **both** of the required core courses in the concentration: SOC 105 and SOC 215, **and**
- complete **four** additional courses from the following list: SOC 217, 220, 222, 311, 315, 325, 326/526, 358/558, 370/570, 373, and 427.

Students completing the concentration receive a letter of recommendation from the chair based on their cumulative academic record in the concentration. Please contact Heather Gowe (Undergraduate Program Coordinator), or Szonja Szelényi (Director of Undergraduate Studies) for additional information on the Business and Organizational Studies concentration.

Introductory Courses

SOC 101 Introduction to Sociology (III)
4 credits. Fall, M. Macy; spring, S. Szelenyi.
This course introduces the discipline of sociology through a survey of core topics, theoretical approaches, and research methodologies. The first part of the course presents a general introduction to micro and macro sociology and to four major theoretical perspectives: functionalism, conflict, interaction, and exchange. We then apply these perspectives to a series of basic topics. The course conveys an appreciation for sociology as a field of study, as well as a better understanding of the society in which we live and its relation to other cultures. Students hopefully gain deeper insight into how they came to be who they are—the social origins of personality, values, and beliefs, including one's sense of reality and conception of human nature. The course also provides opportunities for hands-on experience in testing sociological theories. No prior theoretical or methodological background is required or presumed.

[SOC 103 Self and Society (also R SOC 103) (III)
3 credits. Not offered 2001–2002. M. Macy.
The course is an introduction to micro-sociology, focusing on social processes within small groups, including the family. Emphasis is on leadership, conformity, social influence, cooperation and competition, distributive justice, and micro analyses of interaction.]

SOC 105 Introduction to Economic Sociology (also R SOC 105) (III)
Fall. 4 credits. C. Leuenberger.
Modern social thought arose out of attempts to explain the relationship between economic development and the social transformations that gave rise to the contemporary world. Classical theorists from Karl Marx and Max Weber to Karl Polanyi focused their writings on emergent capitalist economies and societies. Contemporary social theorists likewise have sought to understand the interaction between capitalism and the social forces reacting against and emerging from modern economic development. From exchange and rational choice theories to network analysis and institutional theory, a central theme in contemporary social thought has been the relationship between the economy and society, economic action and social structure, and rationality and fundamental social processes. This course provides an introduction to social thought and research seeking to understand and explain the relationship between economy and society in the modern era.

SOC 108 Introduction to Social Inequality (III)
Fall. 4 credits. M. Brinton.
This course examines the nature and processes of social and economic inequality in industrial societies. The principal focus is on the contemporary United States, with some comparisons to other industrial societies with different educational and class structures. We examine how social and economic institutions encourage or discourage the use of ascription (i.e. inherited or unchangeable traits) vs. achievement as the basis of rewarding individuals, and we consider how individuals make choices as they face different decision points in their schooling and work. Throughout the course we focus on the varied mechanisms of stratification that sort people into schools and workplaces, and we also consider how to judge the "fairness" of these mechanisms. The readings include theoretical and empirical materials on stratification along race, class, and gender lines, and several book-length ethnographies of workplaces or urban settings.

[SOC 115 Utopia in Theory and Practice (III)
3 credits. Not offered 2001–2002. D. Strang.
People have always sought to imagine and realize a better society, with both inspiring and disastrous results. In this course we discuss the literary utopias of Moore, Morris, and Bellamy, and the dystopias of Huxley, Orwell, and Zamiatin. We also examine real social experiments, including nineteenth-century intentional communities, twentieth-century socialisms and religious cults, and modern ecological, political, and millennial movements. Throughout, the emphasis is on two sociological questions: What kinds of social relationships appear as ideal? How can we tell societies that might work from those that cannot?]

[SOC 165 Gangs (III)
4 credits. Not offered 2001–2002.
R. Grannis.
Gangs have existed for centuries and can be found in many if not most countries of the world. In many neighborhoods in the United States, the majority of young nonwhite males have been identified as gang members. State and local politicians routinely identify gang crime as the most important social issue of our time. Despite this, few people can adequately define what it means to be a gang or a gang member. This course reviews classic gang research and theory, surveys a wide variety of recent gang studies, addresses a series of special topics in gang research, and considers the role of the media in guiding our understanding of gangs.]

General Education Courses

[SOC 200 Social Problems (also R SOC 200) (III)
3 credits. Not offered 2001–2002.
T. Hirschl.
For course description, see R SOC 200.]

[SOC 201 Religion and Family in the U.S. (also R SOC 202 and RELST 203) (III)
3 credits. Not offered 2001–2002.
P. Becker.
This course examines how two fundamental social institutions—religion and the family—are interlinked in American society. As recently as the 1950s, religious institutions were organized around the needs of one dominant family form, the male-breadwinner family with a stay-at-home mother. But since the 1950s, that family form is no longer statistically dominant or culturally normative. How have religious institutions adapted to new family forms? How do religious beliefs influence behavior within families, for example, the raising of children? How do

religious groups foster ideals of family life or influence our beliefs about what are "good" families? How do people's family experiences and family values influence their participation in organized religion? What models of family life are religious groups organized around? We begin to answer these questions by drawing on readings that explore the religion-family link in a variety of religious, ethnic, and social class contexts within the contemporary United States.]

SOC 202 Population Dynamics (also R SOC 201) (III)
Spring. 3 credits. P. Eloundou-Enyeque.
For course description, see R SOC 201.

SOC 203 Work and Family (also WOMNS 203) (III)
Spring. 4 credits. Staff.
Family life is often portrayed in the popular media as a haven away from the harsh realities of public life, suggesting that work and family constitute separate and distinct spheres. By contrast, many sociologists point out the links between work and family, and how these links have different consequences for men and women. This course highlights the responses of individuals, employers, and governments, both in the United States and internationally, to the dilemmas posed by the interface between work and family.

[SOC 204 Race and Ethnic Relations (III)
4 credits. Prerequisite: SOC 101, SOC 103, or R SOC 101. Not offered 2001–2002. Staff.
This course focuses on race and ethnic relations in contemporary perspective. It examines the social and behavioral implications of attributions of race and ethnicity in small group interaction, the world of work, and the larger society. Topics covered include: inequalities in income and employment, affirmative action, ethnic political mobilization, patterns of marriage, and family formation.]

SOC 206 International Development (also R SOC 205) (III)
Spring. 3 credits. Staff.
For course description, see R SOC 205.

SOC 207 Problems in Contemporary Society (III)
Fall. 4 credits. D. Heckathorn.
This course examines contemporary social problems, with a focus on their sources in the organization of society. Modern societies are based on three fundamental types of institutions—social norms, hierarchies, and markets. Each is subject to distinctive types of failures resulting in problems that include poverty, prejudice and discrimination, intolerance and hate, alcohol and drug abuse, physical and mental illness, crime and delinquency, and urban problems. In analyzing these problems we emphasize the institutions through which they are created and perpetuated, and the form of institutional change required to address them.

[SOC 208 Social Inequality (III)
4 credits. Not offered 2001–2002. Staff.
This course reviews contemporary approaches to understanding social inequality and the processes by which it comes to be seen as legitimate, natural, or desirable. We address questions of the following kind: What are the major forms of stratification in human history? Are inequality and poverty inevitable? How many social classes are there in advanced industrial societies? Is there a "ruling class?" Are lifestyles, attitudes, and personalities shaped fundamentally by class membership? Can individuals born into poverty readily escape their class origins and move upward in the class structure? Are social contacts and "luck" important forces in matching individuals to jobs and class positions? What types of social processes serve to maintain and alter racial, ethnic, and gender discrimination in labor markets? Is there an "underclass?" These and other questions are addressed in light of classical and contemporary theory and research.]

SOC 215 Organizations: An Introduction (III)
Spring. 4 credits. D. Strang.
Organizations provide the context for much of our everyday life, and are important not only in their own right but for their impact on our individual and collective choices. This course introduces the sociological study of organizations, from project teams to multinational corporations. Main issues include socialization and group processes within work settings; management from the perspective of the manager and the managed; the organization as a site of inequality and mobility; organizational decision-making; efforts to modify organizations by reforming bureaucracy and hierarchy; and comparisons across nations.

SOC 217 The Sociology of Markets (III)
Spring. 4 credits. M. Brinton.
The exchange of goods and services is a central topic in economics, but it has many social dimensions as well. This course examines how economic exchange is affected by the social and cultural contexts within which it occurs. Central themes of the course include: How do patterns of market exchange emerge? What types of social institutions are necessary to make economic exchange predictable and safe? Why do some services cost money in capitalist societies and others do not? How is "market value" determined? We explore these themes through reading studies that compare markets across time as well as across contemporary societies such as the U.S., Japan, China, and Russia.

SOC 219 Segregation (III)
Spring. 4 credits. R. Grannis.
Over seven decades ago, Robert Park noted that "Physical distances frequently are the indices of social distances." As we near the beginning of a new millennium, very little has changed. Segregation may have disappeared from our public discourse, but it is a very present reality in our cities. This course surveys residential segregation by asking some very basic questions: What does it mean to be segregated? How has segregation been different in different times and places? What are the consequences of segregation? Why does segregation occur? How can illegal segregation persist? What can be done about segregation?

SOC 220 Culture and Conflict in Organizations (III)
Spring. 4 credits. P. Becker.
How do the organizations we belong to shape us? What is organizational identity and how does it come about? How do cultural beliefs shape organizations? What kinds of organizations strike us as legitimate and effective, and why? Organizations may be goal-directed problem solvers, but they're also locations for storing and transmitting social facts, like the hierarchical relations among groups, and powerful ideas, including moral codes. Organizations may seem to evolve naturally, but are often shaped by internal conflicts or powerful outsiders. The first part of this course examines theories of organizational culture and power; the second part consists of case studies of organizations, businesses, religious denominations, little league teams, and social movement organizations.

SOC 221 Inequality and Social Science (III)
Spring. 4 credits. Enrollment limited to 20 students. K. Weeden.
What are the promises and limitations of social science as a tool for understanding the sources and consequences of social inequality? This course introduces the underlying logic of social scientific research in the context of contemporary debates about social inequality: e.g., educational testing and tracking, race-based affirmative action, and the roles of intelligence and parental resources in affecting who gets ahead. Its goals are to encourage students to be critical consumers of social scientific data, evidence, and discourse and to develop their own rigorous, informed explanations of social phenomena.

SOC 246 Drugs and Society (III)
Fall. 4 credits. D. Heckathorn.
The course focuses on drug use and abuse as a social rather than as a medical or psychopathological phenomenon. Specifically, the course deals with the history of drug use and regulatory attempts in the United States and around the world; the relationship between drug use and racism/class conflict; pharmacology and use patterns related to specific drugs; perspectives on the etiology of drug use/abuse; AIDS prevention and harm reduction interventions; drug-using subcultures; drug policy, drug legislation, and drug enforcement; and the promotion and condemnation of drug activities in the mass media.

[SOC 250 Religion and Public Life (also RELST 249) (III)
3 credits. Not offered 2001–2002.
P. Becker.
This course explores how religion provides a basis for moral critique, political mobilization, and social identity in a modern society. The first part introduces basic issues—definitions of religion, the sociological approach to the study of religion, and religion and modernity. In the main body of the course, we read studies of specific religious groups and organizations in the contemporary United States, examining such questions as: How does religion provide a basis for gender identity and gender norms? What do religious groups and discourses contribute to public debate on issues ranging from economic justice to abortion? How do religious leaders mobilize citizens for social action in their communities?]

SOC 251 Families and the Life Course (also HD 251) (III)
Spring. 3 credits. E. Wethington.
For course description, see HD 250.

SOC 265 Latinos in the U.S. (also LSP 201 and R SOC 265) (III)
Spring. 3 credits (4-credit option available). H. Velez.
This course is an exploration and analysis of the Hispanic experience in the United States. It examines the sociohistorical background and economic, psychological, and political factors that converge to shape a Latino group identity in the United States. Perspectives are

suggested and developed for understanding Hispanic migrations, the plight of Latinos in urban and rural areas, and the unique problems faced by the diverse Latino groups. Groups studied include Mexican Americans, Dominicans, Cubans, and Puerto Ricans.

Methods and Statistics Courses

SOC 293 Inequality, Diversity, and Justice (also CRP 293, GOVT 293, PHIL 193, SOC 293) (III or IV)
Fall. 4 credits. No prerequisites: intended for freshmen and sophomores. R. Miller, V. Nee.
An interdisciplinary discussion of the nature and moral significance of social inequality, diversity, and poverty and of the search for just responses to them. How unequal are economic opportunities? What are the causes of poverty? To what extent is greater equality a demand of justice? Are traditional welfare programs an appropriate response to poverty? What special significance have race and gender as sources of inequality? Do they merit special remedies such as affirmative action? How should governments deal with religious diversity and other differences in ultimate values? For example, should abortion statutes be neutral toward rival views of the importance of potential human life? What are the causes of worldwide inequality? To what extent do people in per-capita rich countries have a duty to help the foreign poor? Moral argument, investigations of social causes, and legal reasoning interact in the search for answers to these questions. To provide these resources, the course is taught by leading faculty researchers in philosophy, political theory, the social sciences, and law.

SOC 301 Evaluating Statistical Evidence (II)
Fall. 4 credits. S. Szelényi.
A first course in statistical evidence in the social sciences, with emphasis on statistical inference and multiple regression models. Theory is supplemented with numerous applications.

SOC 303 Design and Measurement (III)
Spring. 4 credits. Prerequisite: at least one course in sociology. S. Caldwell.
This course covers the foundations of sociological analysis; issues arising from using humans as data sources; the quality of our primary data; methods of data collection; research designs in wide use and their limitations; and pragmatic considerations in doing research on humans, organizations, communities, and nations.

SOC 304 Social Networks and Social Processes (III)
Fall. 4 credits. D. Strang.
How do groups self-segregate? What leads fashions to rise and fall? How do rumors spread? How do communities form and police themselves on the Internet? This course examines these kinds of issues through the study of fundamental social processes such as exchange, diffusion, and group formation. We focus on models that can be explored through computer simulation and improved through observation.

Intermediate Courses

[SOC 309 The Sociology of Marriage (also SOC 509) (III)
4 credits. Not offered 2001–2002. Staff.
Contemporary debate on the nature of the family in the United States often assumes a simplistic decay of the "traditional marriage." This course unpacks the myths and facts that undergird this model. We overview the historical patterns of marriage in the United States, examine data on contemporary union formation and dissolution and the consequences, and explore various theoretical models of marriage and its decline.]

[SOC 311 Group Solidarity (III)
4 credits. Not offered 2001–2002. M. Macy.
What is the most important group that you belong to? What makes it important? What holds the group together, and how might it fall apart? How does the group recruit new members? Select leaders? Make and enforce rules? Do some members end up doing most of the work while others get a free ride? We explore these questions from an interdisciplinary perspective, drawing on sociobiology, economics, and social psychology, as we apply alternative theories of group solidarity to a series of case studies, such as urban gangs, spiritual communes, the civil rights movement, pro-life activists, athletic teams, work groups, and college fraternities.]

SOC 316 Gender Inequality (III)
Fall. 4 credits. S. Szelényi.
This course offers a comprehensive overview of historical and contemporary patterns of gender stratification. The first few weeks are devoted to the examination of different ideas (biological, functionalist, feminist) about gender inequality. The remainder of the course involves both theoretical analyses and empirical investigations of four substantive areas: the historical development of gender stratification, the nature of gender inequality in contemporary societies, cross-national comparison of gender inequality, and strategies for social change. Specific topics include: division of labor between men and women; relationship between social class and gender; dynamics of occupational sex segregation; gender differences in social mobility, socialization, and educational attainment; and racial and cross-national variations in gender inequality. Each section includes examination of key theoretical debates and a survey of recent feminist research that is relevant to those debates.

SOC 323 Social Networks (also SOC 523) (III)
Spring. 4 credits. R. Grannis.
A critical survey of theories and techniques of structural analysis in sociology, centering on the usefulness of social network analysis in providing integration of studies at different levels of generality. Applications in the areas of the sociology of organizations, community studies, social stratification, and dependence relations among nations. Emphasis on the mutual relevance of theories and operational research procedures.

SOC 324 Environment and Society (also S&TS 324 and R SOC 324) (III)
Spring. 3 credits. L. Glenna.
For course description, see R SOC 324.

[SOC 325 Socialist Societies (III)
3 credits. Not offered 2001–2002.
S. Szelényi.
This course begins by surveying the idea of socialism from the Romantic tradition of William Morris to the scientific theory of Karl Marx and the unique doctrine of Mao Tsetung. These visions are contrasted to the realities of actually existing socialist societies—especially those of Eastern Europe. Some of the themes examined include: the problems of centrally managed economies, the extent and dynamics of social inequalities, dissent and opposition under socialism, and strategies for economic reform. The course concludes by evaluating a number of alternative views on the nature of these societies and by discussing their post-communist transformation.]

SOC 326 Social Policy (also SOC 526) (III)
Fall. 4 credits. S. Caldwell.
The dramatic growth of the policy research sector as an institutional and intellectual force signals the changing relationship of social science to social policy in the United States. With an eye on that relationship, this course examines the development of social policy in selected areas, among them welfare, poverty, housing, crime, and health. The policy research sector itself—people, values, and institutions—is also surveyed.

[SOC 333 Primate Societies (III)
3 credits. Not offered 2001–2002.
R. Grannis.
All primates (including humans) share a common social and cultural, as well as biological, heritage which was bequeathed to us by our common ancestors. This shared inheritance is even more pronounced between humans and their closest nonhuman relatives, chimpanzees and gorillas. This course surveys the social behaviors and cultural forms of our primate cousins with a special focus on baboons, chimpanzees, and gorillas. We begin by reviewing the diversity of primates and their societies. We then look at primate socioecology including demography, hunting and gathering, and kinship. Next, we examine the politics, economics, communication, and culture of some of our more closely related primate cousins. In addition to sharing a common past, all primates (except for some recent humans) are hunter-gatherers with similar biological capacities and needs who have solved similar socioecological problems. We end the course by considering the implications of these findings for our lives as human primates.]

SOC 340 Health, Behavior, and Health Policy (III)
Spring. 4 credits. S. Caldwell.
This course examines the social contexts of physical and mental health, illness and medical care; its purpose is to explore the contributions of social science to health promotion and health policy. Topic areas include: the social context of health, disease and illness; the social organization of health services; use of health services; effectiveness of health service use; health promotion and disease prevention; and national health care policies.

SOC 341 Modern European Society and Politics (also GOVT 341) (III)
Spring. 4 credits. S. Tarrow.
For course description, see GOVT 341.

SOC 352 The Sociology of Contemporary Culture (III)
Spring. 4 credits. C. Leuenberger.
This course introduces the rapidly expanding field at the intersection of sociology and cultural studies. It provides an introduction to theoretical debates in cultural studies and to sociological studies of popular culture. We discuss the emergence of the tourist industry, the significance of consumption in modern life, narratives in popular films, the culture of music and art, the use of rhetoric in social life, cultural analyses of science, and the social construction of self, bodies, and identities.

[SOC 353 Knowledge and Society (III)
3 credits. Not offered 2001–2002.
C. Leuenberger.
This course focuses on the historical evolution of the sociology of knowledge as a theoretical paradigm and an empirical research field. We examine the phenomenological origins of the sociology of knowledge and many of its central texts. We study how it has been applied to such areas as personhood, interaction, religion, identity, and the emotions. We also consider epistemological questions that arise, and cover various theoretical and empirical approaches which have been influenced by the sociology of knowledge such as ethnomethodology, conversation analysis, and the sociology of science and technology.]

SOC 357 Schooling and Society (III)
Spring. 4 credits. S. Morgan.
After an examination of alternative theories of the development and changing function of educational institutions in society, this course examines explanations for why individuals obtain educational training, how an individual's family background and race affect his or her trajectory through the educational system, and how and why society confers advantages on educated individuals. Following a review of recent empirical research on effective schools, the course concludes with an examination of current policy debates in the United States, focusing primarily on school choice, vouchers, and financial aid for a college education.

[SOC 370 Careers (also SOC 570) (III)
4 credits. Not offered 2001–2002. Staff.
By examining various career paths, we will consider the implications of career as a continuous process or as a sequence of positions. We will explore the differences and similarities among different career paths and lay out the patterns and structures of career formation from a sociological point of view. We will also discuss the settings in which career development takes place, giving some comparative attention to ways of organizing careers in other societies.]

SOC 371 Comparative Social Stratification (also R SOC 370) (III)
Fall. 3 credits. S. Feldman.
For course description, see R SOC 370.

[SOC 375 Classical Theory (III)
3 credits. Not offered 2001–2002.
S. Szelényi.
The course introduces students to major macro-sociological paradigms and encourages them to participate in "cross-paradigm" debates. The three main theorists of sociology (i.e., Marx, Durkheim, and Weber) are compared with respect to their approaches to the social sciences, their views on human history, their conceptions of capitalist society, and their ideas on social change. The assigned readings focus on the original writings of these theorists, while the lectures provide the requisite socio-historical context.]

[SOC 380 Gender, Ideology, and Culture (also WOMNS 380) (III)
4 credits. Not offered 2001–2002.
P. Becker.
This course explores representations of women in popular culture, including images, narratives, and religious practices. We examine the relationship between popular culture and ideology, and look at how women "read" popular culture. The aim of the course is to enable students to think critically and analyze the effects of ideological representations of difference on personal identity construction, status, and power relationships. Readings are drawn mostly from the sociology of culture and cultural studies; most texts deal with popular culture and gender in the ninteenth- and twentieth-century United States.]

[SOC 393 Sociology of War and Peace (III)
4 credits. Not offered 2001–2002.
R. M. Williams, Jr.
Every human group, community, or society presents many examples of altruism, helping, cooperation, agreement, and social harmony. Each grouping or society also manifests numerous examples of competition, rivalry, opposition, disagreement, conflict, and violence. Both conflict and cooperation are permanent and common aspects of the human condition. Collective conflicts, especially wars and revolutions, are frequent and dramatic events. But "peace" and "war" are equally active social processes, not passive happenings. This course describes various commonly accepted but erroneous notions of the causes and consequences of war and deterrence. It deals with the major theories concerning the sources of war in international and intranational social systems. The last half of the course analyzes the modes, techniques, and outcomes of efforts to restrict, regulate, and resolve international conflicts.]

Advanced Courses

The following courses are intended for advanced undergraduates with substantial preparation, as well as for graduate students in sociology and related disciplines. The normal prerequisite for all 400-level courses is one introductory course plus 301 (or an equivalent statistics course). Students who are not sure whether their background is sufficient for a particular course should consult the professor.

[SOC 404 Economy and Family—Interrelationships over the Life Course (also SOC 504) (III)
4 credits. Not offered 2001–2002.
M. Clarkberg.
While sociologists have often argued that the modern family has shed most of its "productive" functions, economic models have never been more central in the study of the family. This course explores the emerging dialogue between economists and family scholars along two related dimensions. First, we examine the reciprocal relationship between the structure of the economy (including income, careers, and workplace characteristics and policies) and family structure and outcomes. Second, we weigh the contribution of economic or "rational actor" models to the study of family behaviors. These related economic processes are used to examine marriage and divorce, time use and the division of labor within families, population growth, and the dynamics of health and aging.]

SOC 408 Qualitative Methods (also SOC 508) (III)
Fall. 4 credits. P. Becker.
This course is designed to introduce students to qualitative research. We focus on interviewing, document review, and participant observation, although we also talk about validity, reliability, ethics, and research-involvement, issues that are applicable to qualitative research more broadly. Each student designs and carries out a semester-length research project, keeps a field journal, and completes a final research report.

SOC 419 Segregation (III)
Spring. 4 credits. R. Grannis.
For course description, see SOC 219.

[SOC 427 The Professions: Organization and Control (also ILROB 427) (III)
Fall. 3 credits. Prerequisite: permision of the instructor. Not offered 2001–2002.
P. Tolbert.
For course description, see ILROB 427.]

SOC 429 Culture and Agency (also SOC 529) (III)
Fall. 4 credits. P. Becker.
This course looks at the development of sociological theory on questions of culture and agency. Starting with various reflection or materialist approaches to culture that decenter agency, we then follow the development of theories that explicitly link culture to actors and events in an attempt to account for both social reproduction and social change. The readings cover a broad time span and a variety of intellectual approaches, including critical theory and cultural studies, but center on the sociology of culture.

SOC 437 Social Demography (also R SOC 438) (III)
Fall. 3 credits. D. Gurak.
For course description, see R SOC 438.

[SOC 438 Immigration and Ethnic Identity (III)
4 credits. Not offered 2001–2002. V. Nee.
Immigration has been a central process in the peopling of American society. The early immigration to the United States involved primarily the migration and settlement of European national groups. Since 1965, the mix of immigration has shifted to include an increasing diversity of ethnic groups, especially from Latin America and Asia. As American society moves into an era of increasing ethnic diversity, issues of ethnic boundaries and identities become increasingly complex and problematic. This course seeks to examine the causes of international migration, the dynamics of immigrant incorporation into American society, and the making of new ethnic groups and identities.]

SOC 457 Health and Social Behavior (also HD 457) (III)
Fall. 3 credits. Prerequisites: HD 250, SOC 101, R SOC 101, or SOC 251 **and** a course in statistics. Letter grades only.
E. Wethington.
For course description, see HD 457.

[SOC 480/580 Identity and Interest in Collective Action (III)
4 credits. Not offered 2001–2002. M. Macy.

This seminar examines the problem of collective action from alternative theoretical perspectives: one centered on shared *interests*, the other on common *identities*. The former claims that groups are held together because the members are interdependent and thus benefit from cooperating in a common endeavor. Others argue that effective mobilization may depend on affective ties among participants who share a salient demarcation. We explore this debate, and its possible resolution, through an examination of formal theoretical studies (especially computer simulation) as well as empirical research using experimentation and comparative case analysis. Key concepts addressed include social dilemmas (and game-theoretic analysis), the free-rider problem, rational choice theory, formal and informal social control, social identity theory, and the role of networks and institutions as mechanisms for reconciling the tension between individual self-interest and collective obligations.]

SOC 491 Independent Study
Fall or spring. 1–4 credits. This is for undergraduates who wish to obtain research experience or to do extensive reading on a special topic. Permission to enroll for independent study will be granted only to students who present an acceptable prospectus and secure the agreement of a faculty member to serve as supervisor for the project throughout the term. Graduate students should enroll in 891–892.

SOC 495 Honors Research
Fall or spring. 4 credits. Limited to sociology majors in their senior year. Prerequisite: permission of instructor.

SOC 496 Honors Thesis: Senior Year
Fall or spring. 4 credits. Prerequisite: Sociology 495.

Graduate Core Courses

These courses are primarily for graduate students in sociology but may be taken by other graduate students with permission of the instructor.

SOC 501 Basic Problems in Sociology I
Fall. 4 credits. V. Nee.
Analysis of theory shaping current sociological research. Examination of several central problems in sociological inquiry provides an occasion for understanding tensions and continuities between classical and contemporary approaches, for indicating the prospects for unifying microsociological and macrosociological orientations, and for developing a critical appreciation of efforts to integrate theory and research.

SOC 502 Basic Problems in Sociology II
Spring. 4 credits. D. Heckathorn.
Continuation of SOC 501. Emphasis is on the logical analysis of theoretical perspectives, theories, and theoretical research programs shaping current sociological research. The course includes an introduction to basic concepts used in the logical analysis of theories and examines their application to specific theories and theoretical research programs. Theoretical perspectives include functionalism, social exchange, and interactionism.

SOC 505 Research Methods I: The Logic of Social Inference
Fall. 4 credits. Prerequisite: a first course in statistics and probability. M. Clarkberg.
This course is an introduction to techniques of social inference. We cover research methods, sources of evidence, model design, and questions of empirical validity.

SOC 506 Research Methods II
Spring. 4 credits. S. Morgan.
This is a course on advanced linear regression analysis in theory and practice. After a review of classical bivariate regression and elementary matrix algebra, the course progresses under the credible assumption that the most important fundamentals of data analysis techniques can be taught in the context of simple multivariate linear models. Accordingly, the course provides a relatively formal treatment of the identification and estimation of single equation OLS and GLS regression models, instrumental variable models, traditional path models, and multiple indicator models. Interspersed with this material, the course addresses complications of regression modeling for the practicing researcher including: missing data problems, measurement error, regression diagnostics, weighting, and inference for surveys. The course concludes with a brief introduction to nonlinear regression, counterfactual models of causality, Bayesian inference, and hierarchical models.

Graduate Seminars

These seminars are primarily for graduate students but may be taken by qualified advanced undergraduates who have permission of the instructor. The seminars offered in each term are determined in part by the interests of students, but it is unlikely that any seminar will be offered more frequently than every other year. The list below indicates seminars that are likely to be offered, but others may be added and some may be deleted. Students should check with the department before each term.

[SOC 504 Economy and Family (also SOC 404)
4 credits. Not offered 2001–2002. M. Clarkberg.
For course description, see SOC 404.]

SOC 508 Qualitative Methods (also SOC 408)
Fall. 4 credits. P. Becker.
For course description, see SOC 408.

[SOC 509 The Sociology of Marriage (also SOC 309)
4 credits. Not offered 2001–2002. Staff.
For course description, see SOC 309.]

SOC 510 Seminar on Comparative Societal Analysis
Spring. 3 credits. Open to advanced graduate students throughout the social sciences, with permission of instructor. M. Brinton.
This seminar is intended for advanced graduate students interested in comparative methods and research in the social sciences. It is offered in conjunction with the Comparative Societal Analysis program in the Einaudi Center for International Studies. Students enrolled for credit write critiques of papers presented at the seminar by faculty members and other graduate students, and work on their own project. Some weeks are devoted to collective reading and analysis of background work. Students may enroll for more than one semester.

SOC 518 Social Inequality: Contemporary Theories, Debates, and Models
Fall. 4 credits. D. Grusky.
This course serves as an introduction to contemporary theories, debates, and models regarding the structure of social classes, the determinants of social mobility, the sources and causes of racial, ethnic, and gender-based inequality, and the putative rise of postmodern forms of stratification. The twofold objective is to both review contemporary theorizing and to identify areas in which new theories, hypotheses, and research agendas might be fruitfully developed.

SOC 519 Workshop on Social Inequality
Spring. 4 credits. K. Weeden.
This workshop provides a forum for students, faculty, and guest speakers to present and discuss their current research projects related to social inequality.

SOC 523 Social Networks (also SOC 323)
Spring. 4 credits. R. Grannis.
For course description, see SOC 323.

SOC 526 Social Policy (also SOC 326)
Fall. 4 credits. S. Caldwell.
For course description, see SOC 326.

[SOC 527 Artificial Social Life
4 credits. Not offered 2001–2002. M. Macy.
This seminar is an introduction to computer simulation. The course surveys the history of social simulation and introduces students to complexity theory, game theory, and evolutionary models of social change. The remainder of the course (nine weeks) teaches students to program in Delphi and gives them simulation programs to modify as a class project.]

SOC 529 Culture and Agency (also SOC 429)
Fall. 4 credits. P. Becker.
For course description, see SOC 429.

[SOC 531 Group Conflict and the Nation-State
4 credits. Not offered 2001–2002. D. Strang.
The growth of nationalism and the conflict over which groups control the state form a central dynamic in the global political order. Such conflicts appear particularly virulent today, when internal aggression and ethnic cleansing are a larger threat than inter-state war. We examine nationalism, group conflict, and the process of group formation. Questions include: Why and when do groups struggle for national independence? What leads some multiethnic societies to be stable and others not? How are high levels of conflict over ethnic/religious makeup of the state related to the expanding reach of the global market? And in what ways are national issues comparable with group formation and conflict in other settings, such as neighborhoods or academic disciplines?]

SOC 546 Economic Sociology
Spring. 4 credits. M. Brinton.
This course introduces the field of economic sociology and covers major topics addressed by sociologists studying the intersection of economy and society. We begin with classic statements on economic sociology and then

move to the invigoration of the field in recent years, reading works that have been instrumental in this invigoration. Consideration is given to the several variants of "institutionalism" that have informed the sociological study of markets, organizations, and economic exchange.

SOC 570 Theories of the Family and the Life Course
Spring. 4 credits. M. Clarkberg.
This course provides an analysis of the theoretical approaches informing sociological understandings of the family and the human life course. Approaches include power and exchange models, interactionism, the new home economics, and life course approaches. Emphasis is on understanding the conflict and congruence between existing theoretical frameworks, and on translating theoretical issues into empirical research questions.

[SOC 575 Seminar in Institutions and Rationality
2 credits. Not offered 2001–2002. V. Nee.
This year-long seminar examines the theoretical logic and assumptions of the new institutionalism in sociology and other social sciences. Understanding the part played by informal constraints of social norms and networks and by formal institutional arrangements (i.e., contracts, property rights, laws, regulations, and the state) encompass the domain of study. The seminar focuses on comparative analysis and case studies illuminating and explaining the part played by institutions in structuring the economic and social transactions of society and specifying the causal mechanisms shaping path dependent institutional change.]

[SOC 580 Simulating Social Dilemmas (also SOC 480)
4 credits. Not offered 2001–2002. M. Macy.
For course description, see SOC 480.]

[SOC 583 Transitions to Market Economies in China and Eastern Europe
4 credits. Not offered 2001–2002. V. Nee.
This course examines the problems and prospects of transitions to markets in China and Eastern Europe. It introduces concepts for understanding the transformation of state socialist economies and analyzes important social and economic developments since 1988. Topics include privatization, joint ventures, new capital markets, entrepreneurship, and labor relations in these changing economies.]

SOC 590 Special Topics: Research Methods
Fall. 4 credits. M. Macy, D. Strang.
This course covers special topics in the analysis of quantitative and qualitative data. The topics covered vary from year to year, but are typically chosen from such possibilities as: networks, social simulation, Bayesian methods, game theory, qualitative research methods, and laboratory experimentation. In fall 2001 the course will include a one-half semester module on event history analysis, and a one-half semester module on social simulation.

SOC 591 Special Seminars in Sociology
Fall and spring. 2–4 credits.
These graduate seminars are offered irregularly. Topics, credit, and instructors vary from semester to semester. Students should look at the sociology department bulletin board at the beginning of each semester for current offerings.

SOC 606–607 Sociology Colloquium
Fall and spring. No credit. Required of all sociology graduate students.
A series of talks representative of current research interests in sociology, given by distinguished visitors and faculty members.

SOC 608 Proseminar in Sociology
Fall. 1 credit. Enrollment restricted to first-semester sociology graduate students.
Discussion of the current state of sociology and of the research interests of members of the graduate field; taught by all members of the field.

SOC 660 Social Movements
Fall. 4 credits. S. Tarrow.
For course description, see GOVT 660.

SOC 680 Workshop on Transnational Contention (also GOVT 681)
Fall. 4 credits. S. Tarrow.
For course description, see GOVT 681.

SOC 691 Independent Study
Fall or spring. 2–4 credits. Prerequisite: graduate status and permission of a faculty member willing to supervise the project. Staff.
For graduates who wish to obtain research experience or to do extensive reading on a special topic. Permission to enroll for independent study will be granted only to students who present an acceptable prospectus and secure the agreement of a faculty member to serve as supervisor for the project throughout the term.

[SOC 725 Analysis of Published Research in Organizational Behavior (also ILROB 725)
3 credits. Not offered 2001–2002. P. Tolbert.
For course description, see ILR 725.]

SOC 891–892 Graduate Research
891, fall; 892, spring. Up to 4 credits each term. Prerequisite: graduate status and permission of a faculty member willing to supervise the project.

SOC 895–896 Thesis Research
895, fall; 896, spring. Up to 6 credits each term. Prerequisite: permission of thesis supervisor.

SPANISH

See Department of Romance Studies.

SWAHILI

See Africana Studies and Research Center.

SWEDISH

See Department of German Studies.

TAGALOG

See Department of Asian Studies.

THAI

See Department of Asian Studies.

THEATRE, FILM & DANCE

D. Bathrick, chair; R. Archer, S. Brookhouse, J. Chu, S. Cole, D. Feldshuh, A. Fogelsanger, (director of the undergraduate program in dance); D. Fredericksen, (director of the undergraduate program in film); J. E. Gainor, (director of graduate studies); K. Goetz, D. Hall, E. Intemann, J. Kovar, B. Levitt (on leave fall 2001 and spring 2002), P. Lillard, B. Milles, J. Morgenroth, M. Rivchin, R. Schneider, J. Self, B. Suber, A. Van Dyke, (director of undergraduate studies); A. Villarejo

Through its courses and production laboratories, the department provides students with a wide range of opportunities in theatre, film, and dance. It offers a theatre arts major with concentration in theatre or film and a major in dance. Majors in these three areas educate students in accordance with the general liberal arts ethic of the college. The programs in dance and film and the advanced undergraduate theatre program give some measure of professional preparation in those arts as well. The department encourages academic and studio participation by students from all disciplines. In the coming year the Department will be changing over to separate major status in the areas of theatre and film, which up to now have been listed as concentrations within the Theatre Arts Major. (Dance has always had separate major status.) As part of the change-over process, this year's catalogue lists for the first time all the course and curricular information for each of the majors in three separate sections.

Theatre Arts Major

Theatre Studies

The theatre concentration offers studies in the history of theatre, dramatic theory and criticism, playwriting, acting, directing, design/technology, and stage management. Students interested in the Theatre Arts major should consult with Alison Van Dyke (Director of Undergraduate Studies, Theatre, Film & Dance).

Course requirements for theatre concentration:		**Credits**
1)	**THETR 240** and **THETR 241** (two-semester introduction to theatre)	8
	THETR 250 Introduction to Theatre Design and Technology	4
	THETR 280 Introduction to Acting	3
2)	Four laboratory courses distributed as follows:	**Credits**
	THETR 151 Production Lab I	1–3
	THETR 153, THETR 253, or **THETR 353** Stage Management Lab I, II, or III	1–3
	THETR 155 Rehearsal and Performance or **THETR 151** in a different area	1–3
	THETR 251 or **THETR 351** Production Lab II or III	1–4
3)	Four courses in the area of **Theatre Studies** (see Theatre Studies section of	

theatre courses) chosen in the following manner:

one course must be at 300 level

one course must be at 400 level

two additional courses at the 300 or above level

one of the four courses must be pre–twentieth century.

4) Three courses (at least 9 credits) in other Theatre courses chosen in consultation with the faculty adviser. Course taken to qualify for admission to the Advanced Undergraduate Theatre Program (described below) may also be used to fulfill this requirement.

5) Courses in which a student receives a grade below "C" cannot be used to fulfill the requirements for a Theatre Arts major.

Honors

The Theatre Arts honors program is for majors who have demonstrated exceptional ability in the major and who seek an opportunity to explore branches of their subject not represented in the regular curriculum or to gain experience in original research. To be part of the honors program the student must maintain a GPA of 3.5 in classes for the theatre major and an average of 3.0 in all courses. Students must consult with their advisers in the spring of their junior year in order to enroll in the honors programs.

The Advanced Undergraduate Theatre Program

The department offers advanced study in directing, playwriting, design/technology, and stage management to students who qualify on the basis of outstanding achievement in course work. Admission to the AUTP is by invitation of the area faculty supervisor and the completion of a recommended "track" of courses or equivalent experience. (For recommended courses of study please see listing of courses at end of departmental listings.) Approval process will include a portfolio review and/or interview. The program provides students with intensive study in theatre as well as the opportunity to collaborate with professional faculty and guest artists.

Independent Study, Internships and Honors

THETR 300 Independent Study
Fall, spring, or summer. 1–4 credits.
Independent study in theatre, film or dance allows students the opportunity to pursue special interests not treated in regularly scheduled courses. A faculty member, who becomes the student's instructor for the course, must approve the student's program of study and agree to provide continuing supervision of the work. Students must prepare a proposal for independent study which is available in 225 Schwartz Center.

THETR 485 Undergraduate Internship
Fall, spring, or summer. 1–3 credits.
To be eligible to enroll and receive credit for an internship, students must either be majors or be concentrators in the department. Students are responsible for arranging their own internships in consultation with the faculty in their area of choice *prior* to preregistration for the semester in which the internship is planned to take place. To receive credit within this course, the internship must be unpaid. Students must follow the rules and procedures stated in the departmental internship form.

THETR 495 Honors Research Tutorial
Fall, spring. 4 credits. Limited to Honors students in Theatre, Film and Dance.
This course is the first of a two-semester sequence (the second is THETR 496) for seniors engaged in an honors project.

THETR 496 Honors Research Tutorial
Fall or spring. 4 credits. Limited to Honors students in Theatre, Film and Dance.
This course is the second of a two-semester sequence (the first is THETR 495) for students engaged in an honors project.

First-Year Writing Seminars

Consult the John S. Knight Institute brochure for times, instructors, and descriptions.

General Survey Courses

THETR 230 Creating Theatre (IV)
Spring. 3 credits. Limited to 25 students. D. Hall and faculty.
An introduction to theatrical production for the nonmajor. Students develop a new critical perspective of the performing arts by examining the creation of theatre onstage and backstage through lectures, demonstrations, discussions with various faculty and staff at the Center for Theatre Arts, and by attending department productions. Some writing is required.

THETR 301 Mind and Memory: Explorations of Creativity in the Arts and Sciences (also ENGL 301 and MUSIC 372) (IV)
Spring. 4 credits. Limited to 40 students.
For description, see ENGL 301.

[THETR 430 Introduction to Theatre Management
Fall. 4 credits. Limited to 15 students. Not offered 2001–2002. J. E. Gainor.
This class is designed to introduce students to the profession of theatre management. The class will be a project-oriented study of components of the field, such as marketing, fundraising, contracts, organizational structures, personnel management, accounting, and box office.]

Theatre Studies Courses

[THETR 223 The Comic Theater (also COM L 223 and CLASS 223) # (IV)
Spring. 3 credits. Not offered 2001–2002. J. Rusten.
For description, see CLASS 223.]

THETR 240 Introduction to World Theatre I @ # (IV)
Fall. 4 credits. R. Schneider.
A survey of the roots of theatrical representation around the world from ritual practice to classical Greek and Roman theatre as well as Indian, Chinese, Japanese, African, and native performance. A charting of major developments in the theatre—playwriting, acting, staging, architecture—through the seventeenth century.

THETR 241 Introduction to World Theatre II # (IV)
Spring. 4 credits. Prerequisite: THETR 240. R. Schneider.
A survey of the major developments and innovations in world theatre since 1642, exploring the evolution of naturalism, the birth of the director, as well as the emergence of the avant-garde in the West and its supposed demise today. This course examines the impact of colonialism on theatre practices around the world.

[THETR 320 Queer Theatre (also ENGL 352 and WOMNS 320) (IV)
Spring. 4 credits. Limited to 20 students. Not offered 2001–2002. J. E. Gainor.
What is Queer Theatre and did it exist before the politicization of Queer Identity? Starting with the Renaissance in England, we examine dramatic, critical, historical, and other writing as we pose questions about spectatorship, visibility and professionalism. Evening film screenings are required.]

[THETR 322 Russian Drama and Theatre (also RUSSL 332) (IV)
Spring. 4 credits. Not offered 2001–2002. S. Senderovich.
See RUSSL 322 for description.]

[THETR 332 Medieval and Renaissance Theatre (also COM L 332) (IV)
Spring. 4 credits. Prerequisites: THETR 240 or permission of instructor. Not offered 2001–2002. J. E. Gainor.
Besides the discussion of representative plays from these periods, this class may focus on questions such as the staging of medieval drama, the relation between the church and the community, and the ways in which historians and critics have interpreted the Renaissance, especially in light of class, race, and gender on stage as well as in the audience.]

[THETR 333 European Drama 1660–1900: Moliere to Ibsen (also ENGL 335 and COM L 336) (IV)
Spring. 4 credits. Not offered 2001–2002. R. Parker.
See ENGL 335 for description.]

THETR 335 Modern Western Drama, Modern Western Theater: Theory and Practice (also COM L 335 and ART H 338) (IV)
Fall. 4 credits. R. Schneider.
A study of drama and the cultural contexts of its performance from the mid-nineteenth century to the mid-twentieth century in Europe and America. We move from symbolism and naturalism through to constructivism, expressionism, dadaism, futurism, surrealism and on to Brecht and Artaud and a few of their more contemporary descendants. Students engage in performance projects as well as text analysis.

THETR 336 American Drama and Theatre (also ENGL 336 and AM ST 334) (IV)
Fall. 4 credits. Limited to 25 students. Prerequisite: permission of instructor. J. E. Gainor.
A survey of American theatre from 1900–1960. Emphasis is placed on the relationship among theatre, culture, and history.

THETR 337 Contemporary American Theatre (also ENGL 337) (IV)
Spring. 4 credits. Limited to 20 students. J. E. Gainor.

A survey of American drama and theatre post-1960. Particular emphasis will be placed on plays by women and dramatists of color. We explore questions of identity and theatrical responses to contemporary American culture.

THETR 339 The Avant-Garde: Dead or Alive? (IV)
Spring. 4 credits. Limited to 15 students. R. Schneider.
This class will explore experimental performance today, with concentration on the performative bases of the European and American Avant-Garde in art and in theater. We engage in the debate about whether the avant garde is "dead" or not, based on contemporary examples. We also explore whether or not there was/is an "avant-garde" in other parts of the world—Africa, Japan, India, and so on. We begin by studying the historical avant-garde, but move quickly to the "neo-avant-garde" and to theories and practices of theatrical postmodernism and performative installation art. Students make performative/art work as well as engage in text analysis.

[THETR 345 The Tragic Theater (also CLASS 345 and COM L 344) (IV)
Spring. 4 credits. Limited to 40 students. Not offered 2001–2002. F. Ahl.
See CLASS 345 for description.]

[THETR 372 English Drama to 1700 (also ENGL 372) # (IV)
Fall. 4 credits. Not offered 2001–2002. S. McMillin.
See ENGL 372 for description.]

[THETR 373 English Drama from 1700 to the Present (also ENGL 373) (IV)
Spring. 4 credits. Not offered 2001–2002. S. McMillin.
See ENGL 373 for description.]

[THETR 403 Ritual, Play, Spectacle, Act: Performing Culture (also THETR 603) (IV)
Fall. 4 credits. Not offered 2001–2002. R. Schneider.
Taking a broad spectrum approach to performance, this course includes anthropological texts on ritual and play, sociological texts on performances in everyday life, literary studies texts on "performatives" in speech and writing, folklore studies on parades and reenactments, psychological and philosophical studies on the role of performance in the formation of identity, as well as standard texts of the theater. We consider the distinctions between play, ritual, spectacle, festival, theater, and the "visual" arts. We explore the differences between spectating and witnessing and examine studies on audience behavior. At the base of our inquiry is the broad issue of the role of representational practices within culture and among cultures. If, as Barbara Meyerhoff has written, we understand ourselves by showing ourselves to ourselves, what role does "showing" have in construction of the selves we seek to understand? Why is postmodern culture often called the "society of the spectacle" (Debord)? If, as Aristotle claimed, we are mimetic creatures at base, which comes first—representation or reality? Looking closely at the notion of "live" art, we weigh theorists who claim that performance is ephemeral and disappearing against those who claim that performance, such as oral history, is resilient and enduring. Students have the opportunity to do fieldwork, create performative works, and engage in scholarly study.]

[THETR 405 Operatic Contacts (also S HUM 405, GERST 404, COM L 408) (IV)
Fall. 4 credits. Permission of instructor. Limited to 15 students. Not offered 2001–2002. A. Groos.
See Society for the Humanities for complete description.]

[THETR 420 Brecht, Artaud, Mueller, Wilson (also GERST 430 and COM L 430) (IV)
Fall. 4 credits. Not offered 2001–2002. D. Bathrick.
See GERST 430 for description.]

THETR 423/623 Translation for the Theatre (also COM L 446/646) (IV)
Spring. 4 credits. Prerequisites: proficiency in language other then English; coursework in dramatic literature, directing, or playwriting. J. E. Gainor.
What is involved in the process of translation for the theatre and what makes a translation effective on stage? What should factor into our selection or creation process for theatrical translations? Using a case-study format for the first half of the term, we examine important dramatic texts in their English translations to consider such issues as humor, colloquial language, political and cultural allusion, poetics, and the use of "literal translation". Dramatists considered may include Aristophanes, Moliere, Chekov, and others. We begin with an overview of translation theory and then move into specifically theatrical concerns, especially from directing, playwriting, and dramaturgical perspectives. The second half of the term functions as a writing workshop; each student selects a script and, bearing in mind our theoretical and practical discussions, works towards developing a playable translation as a final project.

[THETR 424 Elizabethan and Jacobean Drama (also ENGL 425) (IV)
Fall. 4 credits. Limited to 15 students. Not offered 2001–2002. B. Adams.
See ENGL 425 for a complete description.]

[THETR 425 Introduction to Dramaturgy and Dramatic Criticism (IV)
4 credits. Prerequisite: THETR 240 and 241, or their equivalents. Limited to 15 students. Not offered 2001–2002. J. E. Gainor.
What is dramaturg? What does a dramaturg do? We examine this position in the theatre in both historical and practical modes. The class is primarily a practicum, involving dramaturgical work on departmental productions, participation with student playwrights on new script development, and practice in the writing of dramatic criticism.]

[THETR 429 Seminar in Theatre History: The Provincetown Players and Greenwich Village Culture, 1915–1922 (also AM ST 430.3 Honors Program; ENGL 426) (IV)
Fall. 4 credits. Not offered 2001–2002. J. E. Gainor.
This seminar explores a number of artistic, political, and social movements emanating from Greenwich Village in the 'teens and 'twenties, and explore their impact on the evolution of American drama. The Provincetown Players, the theatre company that first showcased O'Neill, Glaspell, Millay, and other important American writers, is the focus of our analysis. The seminar is designed as a case study in the critical practice of cultural studies.]

THETR 431 Theory of the Theatre and Drama (also COM L 433) # (IV)
Fall. 4 credits. Prerequisite: some theatre history and dramatic literature work at the 300 level or permission of instructor. D. Bathrick.
A survey of dramatic theory and theories of theatrical representation from Aristotle to the present.

[THETR 433 Dramaturgy: Play and Period (also ENGL 435) (IV)
Fall. 4 credits. Not offered 2001–2002. J. E. Gainor.]

[THETR 435 Special Topics: The Victorian and Edwardian Theatre (also ENGL 422) (IV)
Fall. 4 credits. Limited to 15 students. Prerequisite: permission of instructor. Not offered 2001–2002. J. E. Gainor.
An in-depth exploration of theatre and drama in England from the mid-nineteenth through early twentieth centuries. Topics include melodrama, the social problem play, the popular stage, the conditions of theatrical production, and the impact of European theatre. Representative authors include Robertson, Pinero, Shaw, Wilde, Robins, Galsworthy, and St. John.]

[THETR 436 The Female Dramatic Tradition (also WOMNS 433) (IV)
Spring. 4 credits. Not offered 2001–2002. J. E. Gainor.
Is there a "female dramaturgy?" What is the female tradition in the theatre? The course explores these questions through an investigation of texts by women dramatists, including Hrotsvitha, Aphra Behn, and Caryl Churchill, as well as theory by such critics as Sue Ellen Case and Jill Dolan.]

[THETR 438 East and West German Drama (also GERST 438 and THETR 648) (IV)
4 credits. Not offered 2001–2002. D. Bathrick.
Course covers major historical and textual developments in German theatre from the end of World War II to the present. Leading dramatists from West and East Germany, Switzerland, and Austria (Brecht, Frisch, Durrenmatt, Weiss, Hochhuth, Muller, Braun, Kroetz, Handke, and others) are treated in the light of the political events and aesthetic-dramaturgical traditions from which they emerge and with which they are taking issue.]

[THETR 439 Theatre of Commodities: Advertising, TV, and Performance (also WOMNS 441/641)
Spring. 3 credits. Not offered 2001–2002. R. Schneider and A. Villarejo.
This course explores the employment of bodies and objects as representational emblems of value and desire in late capitalism. We analyze the ways in which desire circulates through print advertising, television, and the avant-garde. We examine sociocultural constructions of the relationship between screen bodies and live bodies, especially as involves advertising and audience. We explore conceptual and culturally inscribed spaces between notions of desire, fulfillment, deferral, and value coding. Throughout, feminist analyses of gender construction and deployment in the realms of the market, popular culture, and "high" art frame our inquiry. Finally we ask questions about the problematic of interventionary tactics in art and popular culture relative to consumption and commodity aesthetics. The

course draws on Williamson, Marx, Benjamin, Freud, Irigaray, de Certeau, Baudrillard, Dienst, Goldman, McClintock, Bordieu, Friedan, Haug, Lee, Fiske, Goffman, Lears, Murray, Taylor, and others as well as numerous print advertisements, television texts, and performance artworks.]

THETR 445 Text Analysis for Production: How to Get from the Text onto the Stage (IV)
Fall. 4 credits. Prerequisite: THETR 240 or THETR 281 or THETR 250 or THETR 398, and permission of instructor. Limited to 15 students. S. Cole.
This course examines the play as the central, essential source for production decisions made by the actor, the director, the designer, and the dramaturg. Students "present" their conclusions about the performance of studied texts through project work as either an actor, director, designer, or dramaturg, as well as through two to three papers.

[THETR 454 American Musical Theatre (also ENGL 454) (IV)
Spring. 4 credits. Prerequisite: ENGL 272 or THETR 240 and 241 and ability to read music at the level of MUSIC 105. Not offered 2001–2002. S. McMillin.
See ENGL 454 for description.]

[THETR 459 Contemporary British Drama (also ENGL 459) (IV)
Fall. 4 credits. Limited to 15 students. Not offered 2001–2002. S. McMillin.
See ENGL 459 for a complete description.]

THETR 461 Asian American and Popular Culture (also AAS 461, AM ST 461, ENGL 461) (IV)
Fall. 4 credits. S. Dave.
For description, see AAS 461.

[THETR 470 The Japanese Noh Theater and Modern Dramatists (also ASIAN 470 and COM L 470) @ (IV)
Fall. 4 credits. Alternates with THETR 471. Not offered 2001–2002. K. Brazell.
For description, see ASIAN 470.]

[THETR 471 Japanese Theatre (also ASIAN 471) @ # (IV)
Fall. 4 credits. Not offered 2001–2002. K. Brazell.
For description, see ASIAN 471.]

[THETR 483 Seminar in Comparative Twentieth-Century Anglophone Drama (also ENGL 483) (IV)
Fall. 4 credits. Some knowledge of classical and avant-garde theories of drama and theatre would be useful, but is not a prerequisite. T 2:30–4:25. Not offered 2001–2002. B. Jeyifo.
The course explores twentieth-century Anglophone drama in diverse areas of the English-speaking world. Through works of Irish, African, Caribbean, and U.S. playwrights like Friel, Soyinka, Fugard, Walcott, and Shange, the seminar is organized around two principal issues: the use of folk, ritual, vernacular, and carnivalesque performance idioms to transform the received genre of Western literary drama and themes of empire, colony, and postcolony in the making of the modern world.]

THETR 600 Proseminar in Theatre Studies
Spring. 4 credits. Limited to Theatre Arts graduate students.
An introduction to the theory and methods involved in the study of the theatre. Attention focuses on pedogogy and the profession in Part I. Part II explores current scholarly trends.

[THETR 637 Seminar in Dramatic Theory (also COM L 638)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. R. Schneider.
Topic varies each semester.]

[THETR 648 East and West German Drama: Post-1945 (also THETR 438 and GERST 438)
3 credits. Not offered 2001–2002. D. Bathrick.]

[THETR 660 Visual Ideology (also COM L 660 and GERST 660)
Spring. 4 credits. Not offered 2001–2002. G. Waite.
For description, see GERST 660.]

[THETR 679 Bertolt Brecht in Context (also GERST 679 and COM L 679)
4 credits. Requirements: seminar paper that will form the basis for an oral presentation for class discussion. Not offered 2001–2002. D. Bathrick.
See GERST 679 for description.]

[THETR 703 Theorizing Film (also ENGL 703 and FRLIT 695)
Fall. 4 credits. Not offered 2001–2002. T. Murray.
See ENGL 703 for description.]

Acting

THETR 155 Rehearsal and Performance
Fall or spring. 1–2 credits. 1 credit per production experience per semester up to 2 credits per semester. Students must register for the course in the term in which credit is earned. Limited to students who are assigned roles after tryouts at the department's scheduled auditions. Students should add this course only after they have been assigned roles. S-U grades only.
The study, development, and performance of roles in departmental theatre or dance productions or the study and practice of directing as experienced in assisting faculty and guest directors.

THETR 205 Rehearsal Workshop
Fall or spring. 2 credits. Limited to 30 students. Prerequisites: participation in a particular department production; and by permission. Staff.
This course enables students participating in a particular production to gain expertise and/or knowledge to contribute to that production. The focus of the class depends on the needs of a particular production (history, choreography, textwork, dramaturgy, etc).

THETR 280 Introduction to Acting (IV)
Fall or spring. 3 credits. Each section is limited to 16 students. Preregistration and registration only through roster in the department office, 225 Schwartz Center. Staff.
An introduction to the actor's technique and performance skills, exploring the elements necessary to begin training as an actor, i.e., observation, concentration, and imagination. Focus is on physical and vocal exercises, improvisation, and text and character. There is required play reading, play attendance, and some scene study.

THETR 281 Acting I (IV)
Fall or spring. 3 credits. Each section limited to 14 students. Prerequisites: THETR 280 and audition. Registration only through roster in department office, 225 Schwartz Center. 281 is restricted to sophmores and above. B. Milles.
Practical exploration of the actor's craft through improvisation and exercises in physical and psychological action. Scene study using the plays of Williams, Inge, and Miller.

THETR 282 Standard American Stage Speech (IV)
Fall. 3 credits. Prerequisites: THETR 280 and permission of instructor. Limited to 10 students. A. Van Dyke.
An introduction to Standard American Stage Speech. We study various regional American accents and Standard American Stage Speech using the International Phonetic Alphabet (IPA) as a way to designate the vowel, diphthong, and consonant sounds of spoken English. The goal of this course is to learn speech for use in performing Shakespeare, Shaw, Checkov, Moliere, etc.

THETR 283 Voice and Speech for Performance (IV)
Fall. 3 credits. Limited to 12 students. Primarily for department majors. Prerequisite: permission of instructor. T. Huffman.
Registration only through department roster in 225 Schwartz Center. Development of the speaking voice with additional emphasis on dramatic interpretation.

THETR 284 Speech and Dialects for Performance (IV)
Spring. 3 credits. Limited to 10 students. Primarily for department majors or advance undergraduate training program candidates. Prerequisites: THETR 281 and permission of instructor. A. Van Dyke.
Development of speech and dialects in dramatic text.

THETR 287 Summer Acting Workshop
Summer. 3 credits. Limited to 16 students in a section. B. Levitt and staff.
An introduction to the processes of acting. Practice in training techniques, rehearsal procedures, and methodology.

THETR 380 Acting II (IV)
Fall. 3 credits. Prerequisite: THETR 281 and audition. Limited to 12 students. S. Cole.
A continuation of Acting I. Special consideration is given to a physical approach to characterization using the plays of Chekhov and Ibsen.

THETR 381 Acting III: Advanced Scene Study (IV)
Spring. 3 credits. Prerequisite: THETR 380 and audition. Limited to 10 students. Staff.
This course focuses on advanced problems in language and period style (movement, bows, curtsies, and period dances). Monologues and scenes are drawn from Shakespeare and Moliere.

THETR 385 Advanced Studies in Acting Techniques (IV)
Spring. 3 credits. Prerequisites: THETR 281, audition, and permission of instructor. Limited to 10 students. Topic varies each semester. May be repeated for credit. B. Milles.

[THETR 387 Movement for the Actor
Fall. 3 credits. Prerequisites: THETR 281 and permission of instructor. Limited to 10 students. Not offered 2001–2002. Staff.

Physical skills for the actor are developed through work with LeCoq-based Neutral Mask corporeal mime, and physical acting techniques.]

[THETR 415 The History of Acting (IV)
Spring. 3 credits. Limited to 10 students. Prerequisites: THETR 380 and permission of instructor. Not offered 2001–2002. S. Cole.
A study of the art of acting in its historical and cultural context from the Greeks to the early twentieth century, with an emphasis on an analytical understanding of acting methodology in relation to social context. Lectures and film showings, with student papers and presentations required.]

Directing

THETR 177 Student Laboratory Theatre Company
Spring. 1–2 credits.
The Student Laboratory Theatre Company is a group of student-actors who earn credit by acting in three scenes directed by students taking THETR 498. Students enrolling in SLTC for credit will earn 1 credit for 2 projects and 2 credits for 3 projects. SLTC also meets with directors once a week.

THETR 398 Fundamentals of Directing I (IV)
Fall. 3 credits. Limited to 9 students. Prerequisite: permission of instructor. Special consideration is given to students who have completed THETR 280 or are intending to continue in the area of stage or screen directing. Students should see instructor one year in advance to sign up for course. D. Feldshuh.
Focused, practical exercises teach the student fundamental staging techniques that bring written text to theatrical life. A core objective is to increase the student's awareness of why and how certain stage events communicate effectively to an audience. Each student directs a number of exercises as well as a short scene.

THETR 498 Fundamentals of Directing II (IV)
Spring. 4 credits. Enrollment strictly limited. Prerequisite: THETR 280 and 398, and permission of instructor. Special consideration is given to students who have completed THETR 280 or are intending to continue in the area of stage or screen directing. Recommended: THETR 250 and 281. D. Feldshuh.
This course builds on the staging techniques learned in Fundamentals of Directing I. In this course each student directs a series of projects and public presentations focusing on specific directorial challenges.

THETR 499 Practicum In Directing
Fall or spring. 1–4 credits. Prerequisites: THETR 240, 250, 280, 398, 498, and permission of instructor. D. Feldshuh.
This course allows the student who has completed the appropriate prerequisites the opportunity to direct a full presentation of theatre in conjunction with a faculty mentor. It may also involve an internship with a prominent director on campus or the opportunity to assistant direct a faculty or guest director.

Playwriting

THETR 348 Playwriting (IV)
Fall. 4 credits. Limited to 12 students. Prerequisite: permission of instructor. B. Milles.
Various approaches and techniques are examined as the student is introduced to the art and craft of dramatic writing. The student is required to read dramatic texts, observe theatre productions and rehearsals, and write. The semester culminates in the completion of a 20- to 30-minute one-act play.

[THETR 349 Advanced Playwriting (IV)
Spring. 4 credits. Prerequisite: THETR 348 or permission of instructor. Not offered 2001–2002. Staff.
A continuation of THETR 348, emphasizing advanced techniques and culminating in the completion of a full-length play.]

[THETR 497 Seminar in Playwriting
1–4 credits. Prerequisite: THETR 348 and 349 and permission of instructor. Not offered 2001–2002. Staff.
This class is an extension of THETR 348 and 349. Students formulate a process for developing a full-length play, which they develop over the course of the semester. The class meetings are made up of discussions about the students' process and creative tactics, and reading of material generated by the playwrights.]

Design, Technology, and Stage Management

Design

THETR 250 Fundamentals of Theatre Design and Technology (IV)
Fall and spring. 4 credits. Not open to first-term freshmen. Limited to 12 students. Registration only through department roster in 225 Schwartz Center. A minimum of one credit of Production Lab (THETR 151 or 251) is strongly recommended concurrently. K. Goetz, R. Archer, E. Intemann.
An introduction to design and technology in the theatre. Lectures, discussion, and project work introduce the principles of designing scenery, costumes, lighting and sound, and the technical process of realizing designs on stage. Students are required to purchase materials, which the instructors will specify (approximate cost, $40).

[THETR 263 CAD Studio for the Theatre
Spring. 3 credits. Limited to 8 students. Prerequisite: permission of instructor. Not offered 2001–2002. K. Goetz and selected theatre production faculty and staff.
Students use commercially available 3-D modeling and rendering software to explore the process of designing scenery and lighting for the live theatre. Vectorworks and Photoshop are the primary applications used. Former theatre experience is helpful but not essential.]

[THETR 319 Music, Dance, and Light (IV)
Fall. 3 credits. Attendance at dance concerts and music concerts is required. Not offered 2001–2002. E. Intemann and A. Fogelsanger.
Artistic values, parameters, and concerns of music (sound design), dance, and lighting design are compared and contrasted, and the combination of design elements is analyzed in contemporary dance. Includes writing in response to readings, audio and video recordings, and performances. Some classes devoted to creating sound, movement, and lighting.]

THETR 343 Costume History: From Fig Leaf to Vanity (IV)
Fall. 3 credits. Limited to 20 students. S. Bernstein.
Costume History offers an overview of the history of clothing from the first signs of clothing to the early twentieth century. It investigates personal, social, religious, political, and regional reasons for why and how clothing evolved.

THETR 362 Lighting Design Studio I: Lighting in the Performing Arts (IV)
Fall. 4 credits. Prerequisite: THETR 250 or permission of instructor. Limited to 6 students. E. Intemann.
The theory and practice of lighting design as a medium for artistic expression. This course explores the aesthetic and mechanical aspects of light and their application in the theatre. Artistic style and viewpoint are also covered.

THETR 364 Scenic Design Studio (IV)
Fall. 3 credits. Limited to 10 students. Prerequisite: THETR 250 and 340 or permission of instructor. Students are required to purchase materials which the instructor will specify (approximate cost: $50.00). K. Goetz.
An exploration of the process of designing scenery for the live theatre. Projects employ various media to explore dramatic use of architecture, the scenic space, and elements of interior design. Experience in theatre production and graphic skills is helpful but not essential.

THETR 366 Costume Design Studio (IV)
Spring. 3 credits. Students are required to purchase materials which the instructor will specify (approximate cost: $50). Limited to 10 students. S. Bernstein.
Design of costumes for the theatre, concentrating on script and character analysis, period research, design elements, figure drawing and rendering skills, and an understanding of production style. May be repeated for credit.

THETR 368 Sound Design Studio (IV)
Fall. 3 credits. Limited enrollment to 6 students. Prerequisite: THETR 250 or 252 or permission of instructor. Students are required to purchase supplies (approximate cost $20). W. Cross.
The use of sound as a medium of design for the theatre; research and creation of the theatrical sound score, digital recording and basic audio engineering techniques with projects in post production studio engineering and live recording. Emphasis is on producing viable sound designs for live theatre events.

THETR 369 Digital Audio Studio (IV)
Spring. 3 credits. Prerequisite: THETR 368. Limited to 6 students. By permission of instructor only. W. Cross.
A project oriented course focusing on current techniques in digital audio recording, editing and processing for theatre, and video production. Students explore Digidesign's Pro Tools multitrack environment, MOTU's Digital Performer including basic MIDI operation and methods of synching audio to video. Some experience with audio recording, music, or video production is helpful but not necessary.

THETR 462 Lighting Design Studio II (IV)
Spring. 4 credits. Prerequisite: THETR 362 or permission of instructor. Limited to 6 students. E. Intemann.
This course concentrates on designing lighting for different genres in various venues, developing the lighting designer as a versatile artist. Personal style and artistic commitment are stressed.

THETR 464 Scene Design Studio II (IV)
Spring. 3 credits. Prerequisite: THETR 364 or permission of instructor. Students are required to purchase materials which the instructor will specify (approximate cost $50). K. Goetz.
Projects and activities are tailored to the creative and developmental needs of the individual student with emphasis on developing professional standards and practices that would prepare the student for a major design assignment.

Technology

THETR 252 Technical Production Studio I
Fall. 3 credits. Limited to 6 students. D. Hall and F. Sellers.
Stage Lighting and Sound Technology: the practical aspects of lighting and sound technology including equipment setup, engineering, electrics, organization, recording techniques, and production paperwork are explored through projects, lectures, and class discussions. In addition to twice-weekly class meetings the course requires a laboratory commitment of 50 hours for the semester.

THETR 256 Technical Production Studio II
Spring. 3 credits. Limited to 6 students. Students are required to purchase materials, which the instructor will specify (approximate cost $50.). Prerequisite: THETR 250 or permission of instructor. Additional hands-on time in prop and paint shops required, to be discussed. A. Mansfield.
Scene Painting: introduction to the basic techniques of painting scenery, including but not limited to the layout and painting of bricks, marble, stone, and wood grain for the theatre. Individual projects in scene painting and participation on paint crew for productions are included. **Stage Properties**: introduction to the processes of propmaking, including furniture construction and upholstery techniques, use of shop tools and materials, period research, and painting and finishing.

THETR 340 Theatrical Drafting and Technical Drawing Studio
Fall. 3 credits. Limited to 6 students. Prerequisite: THETR 250 or permission of instructor. S. Brookhouse.
Implementation of the fundamentals of drafting and technical drawing. Introduction of the concept of an individual style in the approach to drafting for the theatre. Involves a series of projects to familiarize students with the convention and process of visualization and drafting.

THETR 352 Themed Entertainment: The Technical Perspective
Fall. 3 credits. Limited to 12 students. R. Archer.
Exploration into the integration of art and science in today's theme parks and interactive entertainment attractions. Papers, projects, and discussions deal with planning and development aspects of large-scale entertainment projects including architecture, engineering, construction, and attraction installation. Focus is on the specialized entertainment technologies that make these attractions work: audio and lighting design, ride and show control systems, and special effects.

THETR 354 Stagecraft Studio
Fall. 3 credits. A minimum of 1 credit of production laboratory (THETR 151 or 251) is strongly recommended concurrently. Prerequisite: THETR 250 or permission of instructor. R. Archer.
An exploration of the techniques and practice of theatre operation, scenic construction, stage mechanics, rigging, painting, and model building.

THETR 356 Costume Construction Studio
Spring. 3 credits. A minimum of 1 credit of production laboratory (THETR 151 or 251) is strongly recommended concurrently. Prerequisite: THETR 250 or permission of instructor. Lab fee of $25 to be paid in class. R. MacPike.
A project/lecture/discussion class in costume research, patterning, cutting, construction, and fitting.

THETR 360 Costumes: Special Projects
Fall. 3 credits. R. MacPike.
This course is designed for students who have completed a basic construction class (in THETR, TXA, or other) and are interested in acquiring skills beyond the basic techniques. The objectives are two-fold: (1) to introduce students to areas of costuming that are not taught presently, such as millinery, corsetry, wig-styling, and underpinning-skills, that will make a costume student more marketable after graduation; and (2) to give students the opportunity (and satisfaction) of seeing their work on stage in an actual theatre production at Cornell. Areas of focus for each semester are determined by particular production needs. For example, when we produce a period play like *Amadeus*, where hats and wigs are needed, the students research, explore, and construct them. If we were to produce a Commedia play, students would explore masks (history and construction). Along with the pieces constructed, students are asked to research and record their findings.

Stage Management

THETR 153 Stage Management Production Laboratory I
Fall and spring. 1–2 credits. May be repeated for credit. Before registering, students must attend an orientation meeting in the Kiplinger Theatre at the Schwartz Center at 7:30 P.M. on the first Tuesday of classes. Prerequisite: permission of instructor. P. Lillard.
Practical experience in theatrical production as assistant stage manager for a dance theatre concert or as a stage manager for readings, Black Box lab productions, or S.L.T.C. under the supervision of the faculty production manager. THETR 370 complements this course.

THETR 253 Stage Management Laboratory II
Fall and spring. 1–4 credits. May be repeated for credit. Before registering, students must attend an orientation meeting in the Kiplinger Theatre at the Schwartz Center at 7:30 P.M. on the first Tuesday of classes. Prerequisite: permission of instructor. P. Lillard.
Practical experience in theatrical production as assistant stage manager for a season production under the supervision of the faculty production manager. THETR 370 complements this course.

THETR 353 Stage Management Laboratory III
Fall and spring. 1–4 credits. May be repeated for credit. Before registering, students must attend an orientation meeting in the Kiplinger Theatre at the Schwartz Center at 7:30 P.M. on the first Tuesday of classes. Prerequisite: permission of the instructor. P. Lillard.
Practical experience in theatrical production as stage manager for a dance theatre concert or an AUTP production under the supervision of the faculty production manager. THETR 370 complements this course.

THETR 370 Stage Management Studio
Fall. 2 credits. Prerequisite: THETR 250 or 280 or permission of instructor. P. Lillard.
Introduction to the concepts and techniques of stage management as they relate to specific areas of production. Development of relevant communication skills and an understanding of the production process as experienced by a working stage manager or assistant stage manager. THETR 153, 253, and 353 complement this course.

THETR 453 Stage Management Laboratory IV
Fall and spring. 1–5 credits. May be repeated for credit. Prerequisite: admission to Advanced Undergraduate Theatre Program. P. Lillard.
Practical experience in theatrical production as stage manager for a season production under the supervision of the faculty production manager.

Production Laboratories

THETR 151 Production Laboratory I
Fall and spring. 1–3 credits. May be repeated for credit. Orientation meeting on the first Tuesday of classes each semester at 7:30 P.M. in the Kiplinger Theatre at the Schwartz Center. P. Lillard, S. Brookhouse, F. Sellers.
This course provides practical experiences in theatrical production. Students can work on scenery, costumes, properties, lighting, or stage crew. No prerequisites or experience required.

THETR 251 Production Laboratory II
Fall and spring. 1–3 credits. Prerequisite: permission of instructor. May be repeated for credit. Orientation meeting on the first Tuesday of classes each semester at 7:30 P.M. in the Kiplinger Theatre at the Schwartz Center. P. Lillard, S. Brookhouse, D. Hall, F. Sellers.
Practical experience in theatrical production, as a light board operator, sound board operator, sound technician, head dresser or scenery/props special project.

THETR 351 Production Laboratory III
Fall and spring. 1–3 credits. May be repeated for credit. Prerequisite: permission of instructor. P. Lillard, R. Archer, S. Brookhouse, K. Goetz, D. Hall, E. Intemann, F. Sellers.

Practical experience in theatrical production as a master electrician, assistant technical director, assistant costume shop manager, or assistant to a faculty or guest director or designer.

THETR 451 Production Laboratory IV
Fall and spring. 1–4 credits. May be repeated for credit. Prerequisite: admission to Advanced Undergraduate Theatre Program. P. Lillard, R. Archer, S. Brookhouse, K. Goetz, D. Hall, E. Intemann.
Practical experience in theatrical production, in the position of designer, shop manager, technical director or sound engineer.

Independent Study, Internships and Honors

THETR 300 Independent Study
Summer, fall, or spring. 1–4 credits.
Independent Study in the theatre allows students the opportunity to pursue special interests not treated in regularly scheduled courses. A faculty member, who becomes the student's instructor for the course, must approve the student's program of study and agree to provide continuing supervision of the work. Students must prepare a proposal for independent study which is available in 225 Schwartz Center.

THETR 485 Undergraduate Internship
Fall, spring, or summer. 1–3 credits.
To be eligible to enroll and receive credit for an internship, students must either be majors or be concentrators in the department. Students are responsible for arranging their own internships in consultation with the faculty in their area of choice *prior* to preregistration for the semester in which the internship is planned to take place. To receive credit within this course, the internship must be unpaid. Students must follow the rules and procedures stated in the departmental internship form.

THETR 495 Honors Research Tutorial
Fall or spring. 4 credits. Limited to Honors students in Theatre, Film and Dance.
This course is the first of a two-semester sequence (the second is THETR 496) for seniors engaged in an honors project.

THETR 496 Honors Research Tutorial
Fall or spring. 4 credits. Limited to Honors students in Theatre, Film and Dance.
This course is the second of a two-semester sequence (the first is THETR 495) for students engaged in an honors project.

Film

D. Bathrick, D. Fredericksen (director of the undergraduate program in film), M. Rivchin, A. Villarejo

The study of film began in this department in the 1930s and continues to be based here. In the intervening years, however, it has also spread into a significant number of other departments in the College: Africana studies, anthropology, Asian studies, comparative literature, English, German studies, history, psychology, romance studies, and women's studies. This proliferation of courses has been accompanied by a comparable proliferation of perspectives and faculty concerns, e.g., the relationship of national cinemas to national literatures and specific cultures, film's relationships to myth and ideology, the use of film as historical evidence, film's efficacy as a rhetorical medium, and film's contribution to perennial issues in aesthetics, the history of the arts, and studies in cognition. The foundational courses in film production and in the history, theory, and criticism of film as an art are centered in this department.

This richness of courses and perspectives is matched by the ways in which students may make film the focus of their undergraduate studies. The three ways currently being used are as follows: (1) majoring in film within the Department of Theatre, Film & Dance; (2) constructing an individually tailored Independent Major in film (including the possibility of placing film in tandem with another medium or discipline); and (3) focusing on film as a College Scholar. Students interested in options 2 or 3 should consult Don Fredericksen (Theatre, Film & Dance) and Lynne Abel (director, College Scholar and Independent Major programs). Students interested in the first option should consult Don Fredericksen (director of the undergraduate program in film). In addition, students should be aware that the College has recently approved a five-course concentration in visual studies, which can be taken independently of, or in conjunction with, a major in film. Students interested in the visual studies concentration should contact Brett deBary, Asian Studies, its director.

Film Major Requirements

The department's film major requires a total of 50 credits in film and related courses. Students should note that a number of film courses—including two required "core" courses: (THETR 375 and 376)—are offered in alternating years. This means that *students cannot fulfill the requirements for the major in less than two years*, and that they should plan accordingly, in consultation with their major adviser. In particular, students must plan to be in residence at Cornell during both their junior and senior year **fall** semesters in order to take THETR 375 and 376.Within the "core" required courses, THETR 274, Introduction to Film Analysis, should be taken during the sophomore year.

Majors wishing to use the production courses in a substantial manner must plan carefully and work within certain limits. These courses are: THETR 277, 377, 383, 477, 478, 493. *Enrollment in each of these courses is limited by the nature of the work and by facilities.* Enrollment in THETR 477, 478, and 493 depends on the quality of previous work in THETR 277, 377, and/or 383; enrollment is not guaranteed. Majors *without* a strong interest in production can complete the production requirement with one course: THETR 277. Majors *with* a strong interest in production should begin instead with THETR 377, after they have taken THETR 274 in their sophomore year. The total credits in production courses cannot exceed 20 hours; this limit is strictly enforced.

1. A core of *four* film courses:

   THETR 274 Introduction to Film Analysis (offered every fall semester) 4

   [THETR 375 History and Theory of Commercial Narrative Film (offered alternate fall semesters; not offered 2001–2002)] 4

   THETR 376 History and Theory of Documentary and Experimental Film (offered alternate fall semesters; offered 2001–2002) 4

   [THETR 277 Video Production I (offered alternate spring semesters, and some summers; next offered spring 2003)] 3

   OR

   THETR 377 Fundamentals of 16mm Filmmaking (offered three semesters in every four; offered fall 2001 and 2002, and spring 2002) 4

2. *One* of the following theatre courses:

   THETR 250 Fundamentals of Theatre Design/Technology 4

   THETR 280 Introduction to Acting 3

   THETR 398 Directing I (prerequisite: permission) 3

3. *Four* courses (15–16 credits) in film offered by Theatre, Film & Dance as below, or by other departments (with consent of adviser):

   [THETR 264 Interpreting Hitchcock (Not offered 2001–2002)] 4

   [THETR 277 Video Production I (next offered spring 2003)] 3

   THETR 291 Filming Other Cultures (offered spring 2002) 3

   [THETR 341 French Film (offered alternate years, not offered 2001–2002)] 4

   THETR 369 Fast Talking Dames (offered fall 2001) 4

   [THETR 378 Soviet Film of 20s and French Film of 60s (offered occasionally; not offered spring 2001–2002)] 4

   THETR 379 Modern Documentary Film (offered alternate spring semesters; offered spring 2002) 4

   THETR 383 Screenwriting (offered every spring semester) 4

   [THETR 386 Third Cinema (offered alternate years; not offered 2001–2002)] 4

   THETR 391 Media Arts Studio I (tentatively scheduled for fall semester 2001) 3

   [THETR 392 Media Arts Studio II (not offered spring 2002)] 3

   [THETR 395 Video: Art, Theory, Politics (offered alternate years; not offered 2001–2002)] 4

   [THETR 396 German Film (offered occasionally; not offered 2001–2002)] 4

   AS&RC 435 African Cinema (offered fall 2001) 4

   [THETR 450 Rescreening the Holocaust (offered occasionally; not offered 2001–2002)] 4

   [THETR 455 History of Modern Polish Cinema (offered alternate spring semesters; next offered spring semester 2003)] 4

   [THETR 473 Film and Spiritual Questions (offered alternate spring semesters; offered spring 2003)] 4

THETR 474 Jung, Film, and the Process of Self-Knowledge (offered alternate spring semesters; offered spring 2002) 4

THETR 475 Seminar in the Cinema I (offered every fall semester; topic varies; may be repeated for credit; topic for fall 2001: Narrative Techniques in the New Hollywood 4

[THETR 476 Seminar in the Cinema II (offered occasionally; not offered spring 2002)] 4

[THETR 477 Intermediate Film and Video Projects: Documentary and Experimental Workshop (offered alternate years; not offered 2001–2002)] 4

THETR 478 Intermediate Film and Video Projects: Narrative Workshop (offered alternate years; offered fall 2001) 4

THETR 493 Advanced Film and Video Projects (offered spring 2002) 4

THETR 653 Myth Onto Film (offered spring 2002) 4

4. 15 credits of related coursework inside or outside the Department of Theatre, Film & Dance (as approved by your major adviser). The courses chosen to fulfill this requirement should reinforce your particular interest in film, and will not necessarily be film courses per se. For example, a student interested in the psychology of film, or in ethnographic film, or in film vis-a-vis intellectual or social history, will be encouraged to choose "related course work" in those areas.

5. *With a grade of less than C, a course cannot be used toward the major.*

6. Course work in production cannot exceed 20 credit hours.

Honors

Students who have maintained a GPA of 3.5 in their film major courses, and an average of 3.0 in all courses, may elect to work for honors in film during their senior year. They must consult with their adviser in the spring of their junior year about the honors program in film. Honors projects are possible in filmmaking, screen writing, and film analysis.

The Advanced Undergraduate Filmmaking Program

The department offers advanced study in filmmaking to students who qualify on the basis of outstanding achievement in film studies and film production courses. Acceptance to the AUFP and admission to the advanced film production course (THETR 493) will be determined by a committee of film faculty in December of each year, based on applications from students who have a proposal (script or treatment) for a film or video project. Up to four such students will also be selected to receive the Melville Shavelson Award to help fund their advanced film projects.

Film Study Abroad

The College of Arts and Sciences, through this department and in consort with a number of other American colleges and universities, offers up to a full year of study at the Paris Center for Critical Studies. The center's program is theoretical, critical, and historical. It is most useful to students whose major interest is in the academic study of film and serves as an intensive supplement to Cornell's film courses. Fluency in French is required. THETR 274 and 375 are prerequisites. Inquiries should be addressed to Professor Fredericksen, Cornell's liaison with the center.

Film majors may also complement their Cornell film studies with work in the Intermediate and Advanced Film and Television Programs of the British American Film in London. Direct inquires to Professor Fredericksen.

[THETR 264 Interpreting Hitchcock (also ENGL 263) (IV)
Fall. 4 credits. Limited to 20 students. Not offered 2001–2002. L. Bogel.
See ENGL 263 for complete description.]

THETR 274 Introduction to Film Analysis: Meaning and Value (also THETR 674) (IV)
Fall. 4 credits. Limited to 40 students. Graduate students should enroll in THETR 674. D. Fredericksen.
An intensive consideration of the ways films generate meaning and of the ways we attribute meaning and value to films. Discussion ranges over commercial narrative, documentary, and personal film modes. Prospective film majors should enroll in their sophomore year.

[THETR 277 Video Production I
Spring. 3 credits. Offered alternate years and occasionally in summer. Limited to 12 students. Permission of instructor. Open to sophomores, juniors, and seniors. Next offered spring 2003. M. Rivchin.
A hands-on, beginning video production course using Super-VHS cameras and editing equipment. Students learn camera, lighting, sound recording, editing, and digital effects through a series of technical exercises. Students develop two short, original video projects to be shown publicly at the end of the semester. A $100 equipment maintenance fee per student is collected in class. Cost for videotape approximately $50–100.]

THETR 291 Filming Other Cultures (also THETR 691 and ANTHR 291/691) @ (IV)
Spring. 4 credits. Limited to 20 students, with preference given to those who have taken either ANTHR 102 or THETR 274. Fee for screening and maintenance, $35. R. Ascher.
For description, see ANTHR 291.

THETR 329 Political Theory and Cinema (also GERST 330, COM L 330 and GOVT 370) (III or IV)
Fall. 4 credits. G. Waite.
For description, see GERST 330.

[THETR 341 French Film (also FRLIT 336) (IV)
Spring. 4 credits. Offered alternate years; not offered 2001–2002. T. Murray.
For description, see FRLIT 336.]

THETR 369 Fast-Talking Dames: Hollywood Comedy (also ENGL 369) (IV)
Fall. 4 credits. L. Bogel.
See ENGL 369 for complete description.

[THETR 375 History and Theory of the Commercial Narrative Film (IV)
Fall. 4 credits. Fee for screening expenses, $10 (paid in class). Prerequisite for film majors THETR 274. Offered alternate years; next offered fall 2002. A. Villarejo.
Consideration of the broad patterns of narration in the history of the commercial narrative film. Emphases are placed on the early articulation of a cinematic means of narration, realism as an artistic style, the nature and functions of popular film, and the modes of modernist and post-modernist "art cinema" narration.]

THETR 376 History and Theory of Documentary and Experimental Film (IV)
Fall. 4 credits. Fee for screening expenses, $10 (paid in class). Prerequisite: THETR 274 is strongly recommended, but not required. Offered altenate years; offered fall 2001. A. Villarejo.
Covers first the history and theory of documentary film up to the end of World War II. Second we cover the history and theory of the experimental and personal film forms in Europe and the United States.

THETR 377 Fundamentals of 16mm Filmmaking (IV)
Fall 2001 and spring 2002. 4 credits. Limited to 12 students. Intended for juniors and seniors (who may need to sign up a year or more in advance) with priority given to film majors. Prerequisite: THETR 274 (or higher-level film studies course) and permission of instructor. Equipment fee, $100 (paid in class). The average cost to each student for materials and processing is $400. M. Rivchin.
A hands-on course in the basics of 16mm filmmaking techniques, requiring no prior production experience, emphasizing creative development of filmic ideas through critical discussion. Students may explore narrative, experimental, documentary, animation, and abstract genres, producing short exercises and a final sound film project (8–12 minutes) to be screened publicly.

[THETR 378 Soviet Film of the 1920s and French Film of the 1960s (IV)
Spring. 4 credits. Fee for screening expenses, $10 (paid in class). Prerequisite: THETR 375 is strongly recommended, but not required. Offered occasionally; not offered 2001–2002. D. Fredericksen.
An intensive treatment of two distinct periods of radical innovation in film theory and history. Emphasis is on the animated relationship between theory and filmmaking during these two decades. Major figures include Eisenstein, Pudovkin, Vertov, Kuleshov, Dovzhenko, and Room, in the Soviet 1920s; Godard, Truffaut, Resnais, Rohmer, Tati, Rouch, Bresson, and Bazin in the French 1960s.]

THETR 379 Modern Documentary Film (IV)
Spring. 4 credits. Prerequisite: THETR 376 is strongly recommended but not required. Fee for screening expenses, $10 (paid in class). Offered alternate spring semesters; offered spring 2002. D. Fredericksen.
An intensive consideration of canonical documentary films from 1945 to the present. Emphases are on the documentary film as an artistic form with a distinct history and set of theoretical questions, as a sociopolitical force, as an ethnographic medium within and

without a filmmaker's culture, and as a televised medium of persuasion and expression.

THETR 383 Screenwriting (IV)
Spring. 3 credits. Prerequisites: THETR 274 and 377, or permission of instructor. Limited to 12 students. Staff.
Exercises in various genres of screenwriting. Note: this class is an intensive writing course that demands a great deal of outside work.

[THETR 386 Third Cinema (IV)
Spring. 4 credits. Prerequisite: previous course in film history or analysis helpful, though not mandatory. Offered alternate years. Not offered 2001–2002; next offered spring 2003. A. Villarejo.
This course explores postcolonial film and video through the rubric of "third cinema." We investigate the diverse historical, national, political, and generic commitments of films from Africa, South Asia, Latin America, the United States and the United Kingdom (Sembene, Ray, Brocka, etc.). Readings in film and postcolonial theory guide our critical analyses of the films.]

THETR 391 Media Arts Studio I (also ART 391, ARCH 459, MUSIC 391) (IV)
Fall (tentative). 3 credits. Prerequisite: permission of instructor and junior-level standing required, minimum THETR 377 or 277, or dance studio courses. $50 equipment fee (to be paid in class). Participating faculty include: M. Rivchin, THETR; M. Lyons, ART; J. Zissovici, ARCH; D. Borden, MUSIC.
A collaborative interdisciplinary studio course in a variety of digital and electronic media, including art, architecture, music, dance, film, and video. Group projects and discussions also investigate the artistic and interactive potential of a high-speed intranet connecting arts spaces on campus, by creating virtual and performative events.

[THETR 392 Media Arts Studio II (also ART 392, ARCH 392, MUSIC 392) (IV)
Spring (tentative). 3 credits. Preference given to those who completed Media Arts Studio I. See THETR 391 for prerequisites. $50 equipment fee (paid in class). Offered occasionally; not offered 2001–2002. Participating faculty include: M. Rivchin, THETR; M. Lyons, ART; J. Zissovici, ARCH; D. Borden, MUSIC.
A continuation of Media Arts Studio I. A collaborative interdisciplinary studio course in a variety of digital and electronic media, including art, architecture, music, dance, film, and video. Group projects and discussions also investigate the artistic and interactive potential of a high-speed intranet connecting arts spaces on campus, by creating virtual and performative events.]

[THETR 395 Video: Art, Theory, Politics (also ENGL 395) (IV)
Fall. 4 credits. Offered alternate years; not offered 2001–2002. T. Murray.
For description, see ENGL 395.]

[THETR 396 German Film (also COM L 396 and GERST 396) (IV)
Spring. 4 credits. Requirements: participation in class discussion, one paper, midterm, and final. Offered occasionally; not offered 2001–2002. D. Bathrick.
This course explores German film from the Weimar and Nazi periods to the present in relation to the cultural and sociopolitical context of which it was a part. Readings and lectures are devoted to formal and cultural developments historically as well as interpretive analysis of selected individual films.]

[THETR 450 Rescreening the Holocaust (also COM L 453 and GERST 449) (IV)
Spring. 4 credits. Offered alternate years; not offered 2001–2002. D. Bathrick.
Rescreening the Holocaust offers a survey of the major films dealing with the Holocaust beginning with *Night and Fog* (1955) and including such films as *Holocaust, Schindler's List, Shoah, Life is Beautiful, Sophie's Choice, Jacob the Liar, The Diary of Anne Frank, Kapo, My Mothers Courage*, and others. The course focuses on major issues of debate around the possibilities and limits of representing the Holocaust cinematically as well as questions more specifically concerning commercialization, fictionalization, trivialization, documentation, visualization, and narrativization in the making and distributing of films about this event. What are the concerns that have arisen over the years concerning the dangers of aestheticizing the Holocaust in works of literature and the visual arts? Is it possible to employ a comedic narrative to deal with such a topic, and, if so, what are the benefits or potential problems of such an approach? Is the very treatment of such a topic within the framework of the Hollywood entertainment industry itself a violation of respect for those who perished? The title of the course suggests a methodological approach which emphasizes the notion that screenings of the Holocaust are at the same time often re-screenings, to the extent that they are built on, presuppose, or even explicitly cite or take issue with earlier cinematic renderings.]

[THETR 455 History of Modern Polish Film (IV)
Spring. 4 credits. Prerequisite: some previous film analysis coursework. Offered alternate years; next offered spring 2003. D. Fredericksen.
Analysis of Polish film from 1945 to the present, within the context of Poland's post-war history. Topics include the period of socialist realism, the so-called "Polish School" (1956–1962), the cinema of moral anxiety, Solidarity cinema, and the Polish documentary tradition. Key directors to be considered include Ford, Wadja, Munk, Polanski, Skolimowski, Zanussi, Falk, Piwowski, Bugajski, Krzystek, Kijowski, Zaorski, Kieslowski, and Lozinski. Some attention is given to the development of Polish film theory. The extra-filmic context is set by such works as Norman Davies *Heart of Europe*, Czeslaw Milosz' *The Captive Mind*, and Eva Hoffman's *Exit into History*.]

[THETR 473 Film and Spiritual Questions (also RELST 473 and College Scholar Seminar) (IV)
Spring. 4 credits. Limited to 20 students. Offered alternate spring semesters; next offered spring 2003. D. Fredericksen.
The use of film as a medium for the expression of spiritual questions has a long and rich history, although little attention is given to this fact in contemporary film studies. This seminar examines films and writings by filmmakers who are so inclined, including Baillie, Gardner, Bergman, Dreyer, Bresson, Godard, Scorsese, Brakhage, Belson, Whitney, Rouquier, Newby, Kubrick, and Bae Yong-Kyun. Special attention is given to the work of Andrey Tarkovsky, the Russian film director and theorist. Readings include Tarkovsky's *Sculpting in Time*, Grof's *The Cosmic Game*, Eliade's *The Sacred and the Profane*, Edinger's *The Christian Archetype*, Schrader's *Transcendental Style in Film*, and Warren and Locke's *Women and the Sacred in Film*.

THETR 474 Jung, Film, and the Process of Self-Knowledge (also College Scholar Seminar) (IV)
Spring. 4 credits. Limited to 20 students. Offered alternate spring semesters. D. Fredericksen.
"Know thyself" is one of the oldest and most enduring imperatives of the human spirit, and the *raison d'etre* for liberal studies. This seminar traces in some detail the Jungian approach to this imperative and then tests its critical capacities with respect to films by Fellini (*8 1/2*), Bergman (*Persona*), and Roeg (*Walkabout*). Readings include Jung's *Memories, Dreams, Reflections*, *Two Essays in Analytical Psychology, Archetypes and the Collective Unconscious,* and Murray Stein's *In Midlife*.

THETR 475 Seminar in the Cinema I (IV)
Fall. 4 credits. Limited to 20 students. Prerequisite: THETR 264 or 274 or 375 or permission of instructor. D. Fredericksen.
Topic for fall 2001: Narrative Techniques in the New Hollywood. An intensive study of the "modern classicism" of Hollywood narrative filmmaking, to include *Tootsie, Desperately Seeking Susan, Amadeus, The Hunt for Red October, Parenthood, Alien, Back to the Future, The Silence of the Lambs, Groundhog Day,* and *Hannah and Her Sisters*. Readings will include Thompson's *Storytelling in the New Hollywood*, Bordwell's *Narration in the Fiction Film*, and Prince's *Hollywood Under the Electronic Rainbow, 1980–1989*.

[THETR 476 Seminar in the Cinema II
Spring. 4 credits. Limited to 20 students. Offered occasionally; not offered 2001–2002. Staff.]

[THETR 477 Intermediate Film and Video Projects: Documentary and Experimental Workshop (IV)
Fall. 4 credits. Limited to 8 students. Prerequisites: THETR 377 or 277 as minimum production; preference given to those who have taken THETR 376 (History and Theory of Documentary and Experimental Film), 379 (Modern Documentary Film), 386 (Third Cinema), or 291/691 (Filming Other Cultures); and permission of instructor based on project proposals. Equipment fee: $100 (paid in class). Film projects costs: $300–1,000; video $100–200. Not offered 2001–2002. M. Rivchin.
An intensive course in 16mm filmmaking and digital video in which each student develops a significant documentary or experimental project both critically and creatively. Readings, discussions, and exercises are designed to increase the student's knowledge and practice of: cinematography, lighting, sync-sound filming, and editing techniques; working with labs and sound houses; digital video camera; and both analog and nonlinear (AVID) digital editing.]

THETR 478 Intermediate Film and Video Projects: Narrative and Experimental Workshop (IV)

Fall. 4 credits. Limited to 8 students. Prerequisites: THETR 377 or 277 as minimum production; and THETR 383 (Screenwriting) or 398 (Directing I), and permission of instructor based on proposals. Equipment fee: $100 (paid in class). Film projects costs: $500–1,500; video $100–200. M. Rivchin.

An intensive course in 16mm filmmaking and digital video in which each student develops a significant, original narrative script project which he or she then directs, shoots in crews, and edits. Student may opt for narrative documentary or experimental work as well. Readings, discussions, and exercises are designed to increase the student's knowledge and practice of: directing (one exercise is in coordination with Directing II class); cinematography, lighting, sync-sound filming, and editing techniques; working with labs and sound houses; digital video camera; and nonlinear (AVID) editing.

THETR 493 Advanced Film and Video Projects (IV)

Spring. 4 credits. Limited to 6–8 students. Prerequisite: minimum THETR 377 or 277, preference to those who have taken 477 or 478; recommended: 383 (Screenwriting) and 398 (Directing I). Equipment fee: $100. Project costs: $500–2000, unless group project is funded by the Melville Shavelson fund. M. Rivchin.

This is a third-level film production course in which the entire class produces, directs, and edits a larger sync-sound film project from a prize-winning student screenplay. After a pre-production period including script analysis and directing practice through scene work, students are either selected as or rotate as directors, cinematographers, and sound recordists. They prepare auditions, casting and production management and scheduling. Students may shoot in sync-sound 16mm film or video, working on a specific budget, and will co-edit the film, learning the Avid for digital editing, sound mixing, and so on. The final project is screened publicly at the end of the semester.

THETR 653 Myth Onto Film

Spring. 4 credits. R. Ascher.

For description, see ANTHRO 653.

THETR 674 Introduction to Film Analysis: Meaning and Value

Fall. 4 credits. Limited to 10 graduate students. D. Fredericksen.

An intensive consideration of the ways films generate meaning and of the ways we attribute meaning and value to films. Discussion ranges over commercial narrative, documentary, and personal film modes. Graduate students who intend to teach film at the undergraduate level are especially welcome. In addition to full participation in the work of THETR 274, graduate students will read and discuss in tutorials Dudley Andrew's *The Major Film Theories* and Francesco Casetti's *Theories of Film 1945–1995*.

THETR 691 Filming Other Cultures (also THETR 291 and ANTHR 291/691)

Spring. 4 credits. Fee for film screening and maintenance, $35. R. Ascher.

THETR 691 meets simultaneously with THETR 291/ANTRO 291/691. For topics and issues addressed, please see the description under ANTHR 291. Additionally, all graduate students review widely distributed films of general interest, for example, Werner Herzog's *Where the Green Ants Dream*, and, in consultation with the instructor, review films related to their special interests and major field of study.

[THETR 699 German Film Theory (also GERST 699 and COM L 699)

Fall. 4 credits. Offered every fourth year. Not offered 2001–2002. D. Bathrick.

This course critically examines major German film theories from the Weimar period to the present. Works by Balazs, Arnheim, Kracauer, Benjamin, Adorno, Horkheimer, Kluge, Syberberg, Koch, Elsaesser, and others are discussed in relation to the context in which they emerge as well as current debates in film theory.]

Dance

Faculty: J. Chu, A. Fogelsanger (director of undergraduate program in dance), J. Kovar, J. Morgenroth, J. Self, B. Suber.

PLEASE NOTE: Courses offered in fall 2001 will still carry the designator THETR; courses offered in spring 2002 will carry the new designator DANCE.

The dance program offers courses in dance technique, improvisation, composition, performance, anatomical analysis of movement, dance technology, and the history, theory, and criticism of dance. Technique courses include introductory dance technique, modern dance at three levels, and ballet at three levels. Other dance forms, such as Japanese Noh, Indian dance, and Javanese dance, are offered on a rotating basis. Courses in African and ballroom dance, taken through the Physical Education program, supplement these offerings. Technique courses develop strength, flexibility, coordination, and the ability to perceive and reproduce phrases of dance movement with clarity of rhythm, body design, and expression. The more advanced courses require the ability to perform complex phrases in various styles. Students may earn up to eight academic credits (one each semester) in technique courses. Students may also satisfy the physical education requirement by taking dance technique courses in the dance program. Students taking technique for academic credit must also register through their own colleges. Students who wish to enroll in nonintroductory level dance technique courses must attend a placement class. Placement classes are offered at the beginning of each semester. The schedule for all dance technique courses and placement classes is available in the main office of the Sheila W. and Richard J. Schwartz Center for the Performing Arts.

The faculty offer rehearsal and performance workshops in which they choreograph and rehearse original dances, performed in public concert. Admission to rehearsal and performance courses is by permission. Students may receive one academic credit (S-U grades only) when performing in student-faculty concerts by registering for THETR 155 (fall 2001) or DANCE 155 (spring 2002).

The Dance Major

Note: All courses designated DANCE below will still carry the THETR designator during the fall 2001 semester.

To be admitted to the major, students must have completed two technique courses in modern dance or ballet at level II or above, DANCE 210 (Beginning Dance Composition), and one semester DANCE 212 (Music Resources I), concurrently with DANCE 210. It is recommended that students take DANCE 201 (Dance Improvisation), the optional THETR 250 (Fundamentals of Theatre Design and Technology), and the optional music course before the junior year. The following requirements are expected of the major.

Prerequisites for the Major:

DANCE 210 Beginning Dance Composition (offered every semester)	3
DANCE 212 Music Resources I (offered every semester) concurrently with DANCE 210	1
Two technique courses in modern dance or ballet at level II or above	2
TOTAL	6

Requirements for the Major:	**Credits**
Two semesters each of ballet and modern dance (in addition to the prerequisite)	4
One academic or studio course in non-western form	0–4
DANCE 155 Rehearsal and Performance	1
DANCE 201 Dance Improvisation (offered every spring semester)	1
DANCE 233 Explorations in Movement and Performance (offered every fall semester)	1
Two courses from the following approved list selected in consultation with the student's advisor:	6–8
One of **MUSIC 103** Into to World Music I: Africa and the Americas, **MUSIC 104** Intro to World Music II: Asia, **MUSIC 105** Introduction to Music Theory (or substitute at the appropriate level), **MUSIC 107** Hildegard to Handel, **MUSIC 108** Mozart to Minimalism;	
THETR 250 Fundamentals of Design and Technology;	
DANCE 258 Techno Soma Kinesics (offered every spring semester);	
[DANCE 319 Music, Dance & Light (offered alternate fall semesters, not offered 2001–2002)];	
[DANCE 413 Film and Performance (offered occasionally; not offered 2001–2002)].	
DANCE 310–311 Intermediate Dance Composition (offered every semester)	6
DANCE 312 The Moving Body (offered every fourth or fifth semester; offered fall 2001)	3
DANCE 314–315 Western Dance History (offered alternate years; offered 2001–2002)	8
DANCE 323 Music Resources II (offered every spring semester)	2
[DANCE 418 Seminar in Dance Studies or other 400-level academic dance course (offered alternate years; not offered 2001–2002)]	4
DANCE 491 Senior Project (year-long course offered every year)	6
Total	42–48

Students will be expected to perform in at least two concerts and to present at least two of their own dances, in addition to the senior project.

Honors

Students who have maintained a GPA of 3.5 in classes for the dance major and an average of 3.0 in all courses may elect to work for honors in dance during their senior year. They must consult with their adviser in the spring of their junior year about the honors program in dance.

Courses

Note: All courses designated DANCE below which are offered in Fall 2001 will still carry the THETR designator. The DANCE designation becomes effective in Spring 2002.

Movement Technique

The courses DANCE 122, 125, 231, 232, 233, 303, 304, 306, 307, 308, 309, and 316 are co-listed in the Department of Physical Education (PE) and the Dance major (DANCE) of the Department of Theatre, Film & Dance. Students may register for these courses either through PE in order to satisfy the university's physical education requirement *or* through DANCE for 0 or 1 academic credit, *with a limit of 1 credit per semester and 8 credits total.* Students may not get DANCE and PE credit simultaneously for the same course.

The technique course co-requisite for DANCE 210, 310, 311, 410, and 411 may be fulfilled by DANCE 122, 231, 232, 233, 303, 304, 306, 308, 309, and 316. Students who wish to enroll in a non-introductory level technique course (DANCE 231, 232, 303, 304, 306, 308, 309, and 316) must attend a placement class; pre-enrollment is not allowed. A placement class is held at the beginning of each semester; please contact the department registrar for more information.

Note: All DANCE listings were formerly listed as THETR under the same numbers.

DANCE 122 Dance Technique I (also PE 160)
Fall and spring. 0 to 1 credit. Satisfies the PE requirement if taken as PE. Attendance at dance concerts is required. Fall: J. Chu and J. Self; spring: J. Chu and J. Kovar.
Entry level class. Covers the fundamentals of elementary dance training. Movement sequences focusing on rhythm, placement, and vitality of performance through an anatomically sound dance technique.

[DANCE 125 Introduction to Tap Dancing (also PE 170)
Fall. 0 to 1 credit. Satisfies the PE requirement if taken as PE. Not offered 2001–2002.
This introduction to tap dancing is designed for beginners who have no previous experience with the genre. We begin with basic heel, toe, and ball work before progressing logically to the shuffle, the flap, and their concomitant variations. As one of our goals in tap dancing is to realize (just a few of) the body's percussive possibilities, uninhibited ankles and a sense of rhythm are strongly recommended.]

DANCE 155 Rehearsal and Performance
Fall and/or spring. 1–2 credits. 1 credit per production experience per semester up to 2 credits per semester. Students must register for the course in the term in which the credit is earned; requests for retroactive credit will not be honored. Limited to students who are cast in faculty-choreographed dances. Students may add this course only after they have been assigned roles. S-U grades only.
Course includes the study, development, and performance of roles in departmental dance productions.

DANCE 231 Dance Technique II/ Ballet (also PE 161)
Spring. 0 to 1 credit. By placement only; no pre-enrollment. Satisfies the PE requirement if taken as PE. Attendance at dance concerts is required. B. Suber.
Beginning Ballet technique intended for students with some dance training. Includes all basic barre and centre work focusing on presence and presentation.

DANCE 232 Dance Technique II/Modern (also PE 162)
Fall and spring. 0 to 1 credit. By placement only; no pre-enrollment. Satisfies the PE requirement if taken as PE. Attendance at dance concerts is required. Fall, J. Kovar; spring, J. Morgenroth.
Beginning Modern technique intended for students with some dance training. Material covered includes specific spinal and center work with attention to rhythm, design, and movement expression.

DANCE 233 Explorations in Movement and Performance (also PE 168)
Fall. 0 or 1 credit. Limited to 16 students. Satisfies PE requirement if taken as PE. Attendance at dance concerts is required. J. Self.
A physically demanding exploration into various movement realms. Specific subjects covered are genderized movement, erotic power, spiritual power, ritual, and performance. Techniques include extensive use of breath, animal movement, improvisation, and group games. This course requires an eagerness to investigate the nature of performance and explore unfamiliar territory in movement.

DANCE 303 Dance Technique Workshop (also PE 167)
Fall. 0 to 1 credit. By placement only; no pre-enrollment. Satisfies the PE requirement if taken as PE. Attendance at dance concerts is required. J. Self.
This class goes beyond the conventional modern dance class and looks into the very nature of technical training for dancers by studying and investigating a variety of movement forms including yoga, improvisation, classical, and modern western dance.

DANCE 304 Dance Technique III/Ballet (also PE 163)
Spring. 0 to 1 credit. By placement only; no pre-enrollment. Satisfies the PE requirement if taken as PE. Attendance at dance concerts is required. B. Suber.
Intermediate Ballet technique. Work is done on strengthening the body through a movement technique emphasizing presence and musicality based on harmonic muscular control.

DANCE 306 Dance Technique III/Modern (also PE 164)
Fall and spring. 0 to 1 credit. By placement only; no pre-enrollment. Satisfies the PE requirement if taken as PE. Attendance at dance concerts is required. Fall, J. Morgenroth; spring, J. Chu.
Intermediate modern technique focusing on rhythm, placement, and phrasing for students who are prepared to refine the skills of dancing. Students are challenged by complex phrases and musicality.

DANCE 307 Asian Dance and Dance Drama (also PE 427)
Sec. 01. Indian Dance. 0, 1, or 3 credits. Satisfies the PE requirement if taken as PE. Fall, D. Bor.
This course is designed to give the student a practical working knowledge of Indian classical dance, specifically in the indigenous style of Orissa known as Odissi. The technique strengthens the body and develops grace, rhythmic expression, and dexterity that can benefit all forms of dance.

[Sec. 02. Japanese Noh Theatre. Not offered 2001–2002.]

[Sec. 03. Indonesian Dance Theatre. Not offered 2001–2002.]

DANCE 308 Dance Technique IV/Modern (also Physical Education 166)
Fall. 0 to 1 credit. By placement only; no pre-enrollment. Satisfies the PE requirement if taken as PE. Attendance at dance concerts is required. J. Chu.
Advanced and pre-professional Modern technique. A continuation of and supplement to DANCE 306.

DANCE 309 Dance Technique IV/Ballet (also PE 165)
Fall. 0 to 1 credit. By placement only; no pre-enrollment. Satisfies the PE requirement if taken as PE. Attendance at dance concerts is required. B. Suber.
Advanced and pre-professional Ballet technique. A continuation of and supplement to DANCE 304.

DANCE 316 Dance Technique IV/Western Classical (also PE 172)
Spring. 0 to 1 credit. By placement only; no pre-enrollment. Satisfies the PE requirement if taken as PE. Attendance at dance concerts is required. J. Self.
This course is new in the sense that it blends contemporary modern technical forms and "borrowed" traditional ballet forms into a hybridized mix of "contemporary western classical" technique, emphasizing speed in the feet and legs, flexibility in the trunk and upper body, and the ability to quickly change and reverse directions. Includes extensive use of the barre.

[DANCE 317 Asian Dance II
0, 1, or 3 credits. Prerequisite: DANCE 307 or previous training in Odissi Classical Dance. Satisfies the PE requirement if taken as PE. Attendance at dance concerts is required. Not offered 2001–2002.
The continuation of DANCE 307, Odissi Classical Dance. Emphasis is mainly on choreography as well as continuing to refine and perfect the basic movements learned in the preliminary course. Meets twice weekly for movement classes; an extra class will be arranged to learn the art of makeup.]

Dance Composition

DANCE 201 Dance Improvisation
Spring. 1 credit. Limited to 12 students. Attendance at dance concerts is required. J. Morgenroth.
When the body knows when, where, and how to move without prior direction, we call that improvisation. This course coaxes inspiration, seeking to make it reliable and to keep it surprising. It offers the possibility of "training" one's movement instincts to respond relevantly and with spontaneity. Solo and group forms are covered. Live musical accompaniment.

DANCE 210 Beginning Dance Composition (IV)
Fall and spring. 3 credits. Concurrent enrollment in DANCE 212 and a dance technique class at the appropriate level is required. Attendance at dance concerts is required. Fall, J. Chu; spring, J. Self.
Weekly assignments in basic elements of choreography. Students compose and present short studies that are discussed and reworked. Problems are defined and explored through class improvisations. Informal showing at end of semester.

DANCE 211 Dance Movement Workshop (IV)
Summer. 3 credits. Limited to 15 students. For students with varied levels of training, including those with no experience. J. Kovar.
Students explore new ways of moving and creating dances and prepare short studies each week based on material covered in class. Modern dance technique, improvisation, and composition are covered. Students observe and discuss the main concerns of contemporary performance from the artist's/performer's perspective. Viewings of films, videotapes, and live performances.

DANCE 212 Music Resources I
Fall and spring. 1 credit. MUSIC 105 is recommended as a prerequisite but not required. Attendance at dance concerts and music concerts is required. A. Fogelsanger.
Intended to expand choreographers' music vocabulary and skills through a survey of contemporary music for dance, the study of music and dance collaborations, and rhythm studies. Includes discussing and writing about concerts, recordings, and videotapes. May include rehearsing and performing music or dance. Concentrates especially on the related ideas of counterpoint, polyphony, and simultaneity with regard to music, dance, the two considered together, and other arts singly and in combination. This is a co-requisite for THETR 210/DANCE 210 but other students are welcome.

DANCE 310 Intermediate Dance Composition I (IV)
Fall and spring. 3 credits. Prerequisite: DANCE 210. Concurrent enrollment in a technique class at the appropriate level is required. Fall, B. Suber; spring, J. Self.
Intermediate choreographic projects are critiqued in progress by faculty and peers. Consideration of design problems in costuming and lighting.

DANCE 311 Intermediate Dance Composition II (IV)
Fall and spring. 3 credits. Prerequisite: DANCE 310 and DANCE 323, though DANCE 323 may be taken concurrently. Attendance at dance concerts is required. Concurrent enrollment in a dance technique class at the appropriate level is required. Fall, B. Suber; spring, J. Self.
A continuation of DANCE 310.

DANCE 323 Music Resources II
Spring. 2 credits. Prerequisite: DANCE 212. MUSIC 105 is strongly recommended as a prerequisite but not required. Attendance at dance concerts and music concerts is required. DANCE 212 and DANCE 323 together count as a course for purposes of graduation. A. Fogelsanger.
Intended to expand choreographers' conceptions of music and its uses for dance, including serving as a source for ideas of choreographic organization. A continuation of DANCE 212 in its survey of contemporary music for dance and the study of music and dance collaborations, but also includes examples from film and the plastic arts. Reading topics include criticism and aesthetics of dance, music, and the arts in general. Includes discussion of and writing about concerts, recordings, and videotapes. May include rehearsing and performing music or dance. Concentrates especially on minimalism and polystylism in music, dance, the two considered together, and other arts singly and in combination.

DANCE 410 Advanced Dance Composition I (IV)
Fall and spring. 3 credits. Prerequisite: DANCE 311. Concurrent enrollment in a technique class at the appropriate level is required. Attendance at dance concerts is required. Fall, B. Suber; spring, J. Self.
Students work on advanced choreographic problems, to be presented in performance. Work in progress is critiqued by faculty on a regular basis.

DANCE 411 Advanced Dance Composition II (IV)
Fall and spring. 3 credits. Prerequisite: DANCE 410. Concurrent enrollment in a technique class at the appropriate level. Attendance at dance concerts is required. Fall, B. Suber; spring, J. Self.
A continuation of DANCE 410.

DANCE 491 Senior Project in Dance
Fall and spring. 6 credits per semester. Prerequisite: DANCE 311. This course is limited to senior dance majors only.
Students who take this course create a project in choreography and performance, dance, film or video, dance pedagogy, or other appropriate area agreed on with a member of the dance faculty. In addition, there is a 1–15 page paper which expands their work into a theoretical or historical context.

History, Criticism, and Theory

DANCE 312 The Moving Body: Form and Function (IV)
Fall. 3 credits. J. Morgenroth.
This course examines the bodily systems involved in human movement with particular attention to dance movement. Readings in texts on human anatomy, physiology and kinesiology. We will emphasize the relationships between bodily form and function. Includes guest lectures by experts in anatomy and health areas. Practical analyses of human movement. Demonstration of dissection.

DANCE 314 Western Dance History I: Classical Ballet History as a Reflection of Western Ideology # (IV)
Fall. 4 credits. Attendance at dance concerts is required. B. Suber.
A critical survey of the history of classical ballet defining elements of classicism and determining why ballet is defined as classical. Through texts, videotapes, and live performance, the class explores how ballet has perpetuated or confronted social issues of race, class, gender, sexuality, the body, and abuse.

DANCE 315 Western Dance History II: History of Modern Dance (IV)
Spring. 4 credits. Attendance at dance concerts is required. J. Chu.
This class studies the course of modern dance in the twentieth-century United States. We examine each generation of dancers, starting with Isadora Duncan and ending with performers emerging today. Issues of gender, cultural identity, elitism, and democracy are discussed.

[DANCE 418 Seminar in Dance Studies (IV)
Spring. 4 credits. Not offered 2001–2002.]

DANCE 490 Senior Paper in Dance
Fall and spring. 4 credits. Prerequisite: DANCE 418, senior standing. Attendance at dance concerts is required.
Under faculty direction, the students write a senior paper in dance history, criticism, or theory.

Interdisciplinary Courses

DANCE 258 Techno Soma Kinesics I: Technology and the Moving Body (IV)
Spring. 4 credits. Prerequisite: DANCE 201 or DANCE 210 (or equivalent) or permission of instructor; no freshmen. Limited to 5 students. B. Suber.
Expanding on the specific aesthetic of formal concert dance, this studio class explores new forms of performance dealing with the moving body. Computer programs such as human form animation software (Life Forms and Poser), digital sound production (Protools and Digital Performer), digital imaging (Photoshop and Premiere), as well as traditional lighting, set, and costume design and construction, and sound recording and design techniques, are all utilized to create experimental and/or conceptual multimedia performance/installation work. Theoretical texts on the body and technology are also used.

DANCE 301 Mind and Memory: Explorations of Creativity in the Arts and Sciences (also ENGL 301, MUSIC 372, S HUM 301, THETR 301) (IV)
Spring. 4 credits.
For description, see ENGL 301.

[DANCE 319 Music, Dance, and Light (also THETR 319) (IV)
Fall. 3 credits. Attendance at dance concerts and music concerts is required. Not offered 2001–2002. E. Intemann, A. Fogelsanger.
Artistic values, parameters, and concerns of music (sound design), dance, and lighting design are compared and contrasted, and the combination of design elements is analyzed in contemporary dance. Includes writing in response to readings, audio and video

recordings, and performances. Some classes are devoted to creating sound, movement, and lighting.]

DANCE 358 Techno Soma Kinesics II: The Moving Body and Technology (IV)
Spring. 4 credits. Prerequisite: DANCE 258 (or equivalent), or permission of instructor. Limited to 5 students. B. Suber.
Reflecting the aesthetic of formal concert dance, and expanding on the work accomplished in DANCE 258, students work with more complex elements of multimedia interactive software to create more extensive projects in the field of dance and technology. As opposed to the smaller experimental projects accomplished in DANCE 258, DANCE 358 students are expected to complete substantial projects in interactive multimedia gallery installation/performance work as well as interactive multimedia CD ROM's and web projects, all focused on the moving body.

DANCE 391 Media Arts Studio I (also ART 391, ARCH 391, MUSIC 391) (IV)
Fall. 3 credits. Prerequisite: permission of instructor and junior-level standing required, minimum THETR 377 or 277, or DANCE 258. $50 equipment fee (to be paid in class). Participating faculty include: M. Rivchin, THETR; S. Taft and M. Lyons, ART; J. Zissovici, ARCH; D. Borden, MUSIC.
A collaborative interdisciplinary studio course in a variety of digital and electronic media, including art, architecture, music, dance, film, and video. Group projects and discussions also investigate the artistic and interactive potential of using arts spaces on campus, including virtual and performative events.

[DANCE 392 Media Arts Studio II (also ART 392, ARCH 392, THETR 392, MUSIC 392) (IV)
Spring. 3 credits. Preference given to those who completed Media Arts Studio I. See DANCE 391 for prerequisites. $50 equipment fee (paid in class). Not offered 2001–2002.
A continuation of Media Arts Studio I. A collaborative interdisciplinary studio course in a variety of digital and electronic media, including art, architecture, music, dance, film, and video. Group projects and discussions also investigate the artistic and interactive potential of a high-speed intranet connecting arts spaces on campus, including virtual and performative events.]

Independent Study, Internships and Honors

DANCE 300 Independent Study
Summer, fall, or spring. 1–4 credits.
Independent Study in the dance allows students the opportunity to pursue special interests not treated in regularly scheduled courses. A faculty member, who becomes the student's instructor for the course, must approve the student's program of study and agree to provide continuing supervision of the work. Students must prepare a proposal for independent study which is available in 225 CTA.

DANCE 485 Undergraduate Internship
Fall, spring, or summer. 1–3 credits.
To be eligible to enroll and receive credit for an internship, students must be majors in the department. Students are responsible for arranging their own internships in consultation with the faculty in their area of choice *prior* to preregistration for the semester in which the internship is planned to take place. To receive credit within this course, the internship must be unpaid. Students must follow the rules and procedures stated in the departmental internship form.

DANCE 495 Honors Research Tutorial
Fall or spring. 4 credits. Limited to Honors students in Dance.
This course is the first of a two-semester sequence (the second is DANCE 496) for seniors engaged in an honors project.

DANCE 496 Honors Research Tutorial
Fall or spring. 4 credits. Limited to Honors students in Dance.
This course is the second of a two-semester sequence (the first is DANCE 495) for students engaged in an honors project.

Tracks toward admission into the advanced undergraduate theatre program

Design, Technology, and Stage Management

Recommended for individuals interested in a **Design**, **Technology**, or **Stage Management** track:
THETR 250 Fundamentals of Theatre Design and Technology
THETR 151 and 251 Production Lab I and II (at least one credit of each)

Recommended for Scenic Design emphasis:
THETR 340 Theatrical Drafting and Technical Drawing Studio
THETR 351 Production Lab III (as Design Assistant)
THETR 354 Stagecraft Studio
THETR 364 Scene Design Studio

Upon admission to the program:
THETR 451 Production Lab IV (at least 1 credit)

Recommended for costume design or costume shop management emphasis:
THETR 351 Production Lab III (as Design Assistant)
THETR 356 Costume Construction Studio
THETR 366 Costume Design Studio I

Upon admission to the program:
THETR 451 Production Lab IV (at least 1 credit)

Recommended for Lighting Design or costume shop management emphasis:
THETR 252 Technical Production Studio I
THETR 351 Production Lab III (as Student Electrician)
THETR 351 Production Lab III (as Design Assistant)
THETR 362 Lighting Design Studio I

Upon admission to the program:
THETR 451 Production Lab IV (at least 1 credit)

Recommended for Sound Design emphasis:
THETR 251 Production Lab II (as Student Sound Technician)
THETR 252 Technical Production Studio I
THETR 351 Production Lab III (as Design Assistant)
THETR 368 Sound Design Studio

Upon admission to the program:
THETR 451 Production Lab IV (at least 1 credit)

Recommended for Technical Direction emphasis:
THETR 252 Technical Production Studio I
THETR 256 Technical Production Studio II
THETR 340 Theatrical Drafting and Technical Drawing Studio
THETR 351 Production Lab III (as Assistant Technical Director)
THETR 354 Stagecraft Studio

Upon admission to the program:
THETR 451 Production Lab IV (at least 1 credit)

Recommended for Stage Management emphasis:
THETR 253 or **353** Stage Management Lab II or III—two assignments
THETR 280 Introduction to Acting
THETR 370 Stage Management Studio
THETR 398 Fundamentals of Directing I

Upon admission to the program:
THETR 453 Stage Management Lab IV

Directing

Recommended for individuals interested in a directing track:
THETR 151 and **THETR 251** Production Lab I and II (at least 2 combined credits)
THETR 240/THETR 241 Introduction to Western Theatre (1 Semester ONLY)
THETR 250 Fundamentals of Design and Technology
THETR 280 Introduction to Acting
THETR 398 Directing I
THETR 498 Directing II

Playwriting

Recommended for individuals interested in a playwriting track:
THETR 240/THETR 241 Introduction to Western Theatre (1 Semester ONLY)
THETR 250 Fundamentals of Design and Technology
THETR 280 Introduction to Acting
THETR 348 Playwriting
THETR 349 Advanced Playwriting
Students in the advanced undergraduate theatre program may also elect to take THETR 485 (Undergraduate Internship) in addition to or in place of one production assignment.

UKRAINIAN

See Department of Russian.

URDU

See Department of Asian Studies.

VIETNAMESE

See Department of Asian Studies.

WELSH

See Department of Linguistics.

WOMEN'S STUDIES MAJOR

See "Special Programs and Interdisciplinary Studies."

WRITING PROGRAM

See John S. Knight Writing Program in the section, "Special Programs and Interdisciplinary Studies."

YIDDISH

See Department of Near Eastern Studies.

SPECIAL PROGRAMS AND INTERDISCIPLINARY STUDIES

Africana Studies and Research Center

J. Turner, director (255–5218); A. Adams, N. Assié-Lumumba, A. Bekerie, L. Edmondson, R. Harris, S. Hassan, A. Mazrui, A. Nanji, D. Ohadike. Offices: 310 Triphammer Road, 255–4625 or 255–4626.

The Africana Studies and Research Center is concerned with the examination of the history, culture, intellectual development, and social organization of Black people and cultures in the Americas, Africa, and the Caribbean. Its program is structured from an interdisciplinary and comparative perspective and presents a variety of subjects in focal areas of history, literature, social sciences, and African languages. African languages such as Swahili is consistently offered, fall and spring semesters and taught during summer/winter session.

The center offers a unique and specialized program of study that leads to an undergraduate degree through the College of Arts and Sciences and a graduate degree, the Master of Professional Studies (African and African-American), through the university's Graduate School.

A student may major in Africana Studies; however, another attractive alternative is the center's joint major program. This program enables the student to complete a major in any of the other disciplines represented in the college while at the same time fulfilling requirements for a major in Africana Studies. This requires only a few more credits than is usually the case when one completes a single major course of study. Courses offered by the center are open to both majors and nonmajors and may be used to meet a number of college distribution requirements, including historical/temporal breadth (#) and geographical breadth (@) requirements, such as freshman writing seminars, language (Swahili), expressive arts, humanities, social sciences, and history.

The center also brings distinguished visitors to the campus, sponsors a colloquium series, and houses its own library.

The Africana Major

The undergraduate major offers interdisciplinary study of the fundamental dimensions of the African-American and African experiences. Because of the comprehensive nature of the program, it is to students' advantage to declare themselves Africana majors as early as possible. The following are prerequisites for admission to the major.

Students should submit:

1) a statement of why they want to be an Africana Studies major;
2) a tentative outline of the area of study they are considering (African or African-American) for the undergraduate concentration; and
3) a full transcript of courses taken and grades received.

The center's undergraduate faculty representative will review the applications and notify students within two weeks of the status of their request.

After acceptance as a major in the Africana Center, a student must maintain a C+ cumulative average in the center's courses while completing the major program. The Africana major must complete 36 credits in courses offered by the center, to include the following four core courses: AS&RC 205, 231, 290, and 422. Beyond the core courses, the student must take eight credits of center courses numbered 200 or above and 15 credits numbered 300 or above. The program of an undergraduate major may have a specifically Afro-American focus or a specifically African focus.

Joint Majors

The center encourages joint majors in the College of Arts and Sciences and in other colleges. Joint majors are individualized programs that must be worked out between the departments concerned. The center's undergraduate faculty representative, Professor Bekerie, will assist students in the design and coordination of joint major programs. However, in any joint major program, the center will require at least 16 credits be taken in Africana studies courses, including AS&RC 290.

Double Majors

In the case of double majors (as distinct from joint majors) students undertake to carry the full load of stipulated requirements for a major in each of the two departments they have selected.

Certificate in African Studies

In conjunction with the Institute for African Development, the Africana Studies and Research Center administers an undergraduate Certificate in African Studies program. The certificate is offered as a minor concentration available to students in all of the undergraduate colleges at Cornell. Many of the courses in the program might be used to fulfill other course distribution requirements. By pursuing this certificate, students acquire an interdisciplinary understanding of Africa. After developing a foundation of knowledge on the culture, society, and development of Africa in the core course "Africa: The Continent and Its People," students pursue 15 credit hours in a humanities or development studies track or a combination of the two, including an additional core course, either "African Civilizations and Cultures" or "Contemporary African Development Issues." The requirements for the cetificate are a minimum of 18 credit hours, including the core courses. Students interested in the certificate program must contact Professor Bekerie (the center's undergraduate faculty representative) who will register them in the program and assign them a faculty adviser from their own college. The faculty adviser will be responsible for determining completion of the certificate requirements.

Honors. The honors program offers students the opportunity to complete a library research thesis, a field project in conjunction with a report on the field experience, or a project or experiment designed by the student. The requirements for admission to the honors program for all students—regular majors, joint majors, and double majors—are a B- cumulative average in all courses and a B+ cumulative average in the center's courses. Each student accepted into the honors program will have an honors faculty committee consisting of the student's adviser and one additional faculty member, which is responsible for final evaluation of the student's work. The honors committee must approve the thesis or project before May 1 of the student's junior year. The completed thesis or project should be filed with the student's faculty committee by May 10 of the senior year.

Language Requirement

Courses in Swahili may be used to satisfy the College of Arts and Sciences language requirement. In Swahili, successful completion of AS&RC 131, 132, 133, and 134 provides qualification, and the addition of 202 provides proficiency. AS&RC majors are not required to take an African language, but the center recommends the study of Swahili to complete the language requirement.

AS&RC 131 Swahili
Fall. 4 credits. Laboratory time TBA. A. Nanji.
Beginner's Swahili. Part 1—Grammar for speaking, reading, and writing. Requires no knowledge of language. Swahili is spoken in the East and Central parts of Africa.

AS&RC 132 Swahili
Spring. 4 credits. Prerequisite: Swahili 131. A. Nanji.
Continued study of the basic grammatical formation of the language and the introduction of reading material ranging from songs to short stories. A great many drills are used in this course to help develop the student's comprehension of the language. Swahili tapes are utilized during all of these sequences.

AS&RC 133 Swahili
Fall. 4 credits. Prerequisites: Swahili 131 and 132. Language laboratory time TBA. A. Nanji.
Advanced study in reading and composition.

AS&RC 134 Swahili
Spring. 4 credits. ***Provides language qualification.*** Prerequisite: Swahili 133. A. Nanji.
In this course more emphasis is placed on the development of reading ability and the acquisition of writing skills. Students are expected to read and comprehend selected Swahili stories and write compositions on chosen topics. Ample consideration is given to oral practice in the classroom.

AS&RC 171 Black Families and the Socialization of Black Children
Fall. 3 credits. Staff.
This course provides an examination of the evolution of the Black family from its roots in Africa, the evolution of family forms, the impact of social policy, and a consideration of the literature stressing family and child well-being. Among the major topics considered are

male/female relationships, childbearing and parental roles, the extended family, and economic and health issues. The component of the course focusing on youth primarily covers child and adolescent development.

AS&RC 172 The Education of Black Americans: Historical and Contemporary Issues (III)
Spring. 3 credits. Faculty.
This course is devoted to the history of educating Black Americans. Considerable attention is given to contemporary issues. The major topics of focus include an examination of the debates concerning the type of the education needed, public and private schooling efforts, the Africana Studies movement, community control issues, busing, affirmative action, resegregation debates and new initiatives in education including vouchers and charter schools.

AS&RC 191 Africa: The Continent and Its People @ (III)
Fall. 3 credits. L. Edmondson.
An introductory interdisciplinary course focusing on Africa's geographical, ecological, and demographic characteristics; indigenous institutions and values; the triple cultural heritage of Africanity, Islam, and Western civilization; main historical developments and transitions; and contemporary political, economic, social, and cultural change. Africa's ties with the United States (from trans-Atlantic slavery to the present), its impact on the emerging world order, and its contribution to world civilization are also explored.

AS&RC 202 Swahili Literature @
Fall. 4 credits. Prerequisite: Swahili 134.
A. Nanji.
Students gain mastery over spoken Swahili and are introduced to the predominant Swahili literary forms.

AS&RC 204 History and Politics of Racialisation: A Comparative Study (III)
Spring. 4 credits. A. Bekerie.
The primary focus of this course is on the historical and contemporary significance of racialisation in the United States and South Africa with regard to societal development and inter-relations. It includes an analysis of the historical development of racialised barriers as an instrument of power and privilege. The ways with which racialisation is used as an instrument of ideology to social status, cultural hierarchy and economic positions are also examined. Particular emphasis is given to the development and perpetuation of scientific racism in both places. The apparent success against Jim Crow form of racism in the United States and apartheid in South Africa appears to transform racism into subtle and 'scientific' sphere. This transformation and its continued impact in perpetuating social inequality are further analyzed.

AS&RC 205 African Cultures and Civilizations # @ (III)
Spring. 3 credits. D. Ohadike.
This course is concerned with the peoples of Africa and the development of African cultures and civilizations from the earliest times to the present day. It focuses on the near modern civilizations of Africa south of the Sahara, and the ancient civilizations of Egypt and the Nile Valley, together with their contributions to the development of the major world civilizations. The course also deals with the socio-political organization of African societies, their kinship systems, cross-cutting ties, rites of passage, gender relations, and arts (including music, dance, folklore, architecture, sculpture, painting, and body decoration).

AS&RC 210 Major Works of Black World Writing (IV)
Fall. 3 credits. A. Adams.
This course surveys classic texts by African American, Caribbean, and African writers. The focus is on literary texts by authors such as Langston Hughes, Toni Morrison, James Baldwin, Maryse Conde, and Chinua Achebe, with a view toward analyzing common experiences, references, themes, and literary strategies across the Black world. The works of fiction, poetry, and drama that constitute the central material of the course are supplemented by essays and biographies from other authors who have influenced the creative vision and the movement of the peoples of Africa and the Diaspora, e.g., W. E. B. DuBois and Marcus Garvey, Nelson and Winnie Mandela.

AS&RC 231 African-American Social and Political Thought (III)
Spring. 3 credits. J. Turner.
This is an introductory course that reviews and analyzes the major theoretical and ideological formulations developed and espoused by African-Americans in the struggle for liberation. We focus specifically on the political philosophy and historical significance of Malcolm X, and the work and movement of Marcus Garvey, as the prime movers of nationalism and pan-Africanism among Black people in this century. Such themes as slave resistance, nationalism, Pan-Africanism, emigration, anti-imperialism, socialism and internal colonialism, and the political and social views of Black women are discussed. Black political thought is viewed in its development as responses to concrete conditions of oppression and expression.

AS&RC 271 Introduction to African Development (also CRP and GOVT 271) @ (III)
For description, see CRP 271.

[AS&RC 280 Race, Power, and Privilege in the United States (formerly Racism in American Society) (III)
Fall. 3 credits. Not offered 2001–2002.
D. Barr and J. Turner.
This course is a topical treatment of the history and theory of racism in the United States. The course begins with an examination of basic concepts and theories of racism. From there we examine the history of racial groups in America—African Americans, Native Americans, Asian Americans, and the Hispanic groups. Particular attention is paid to the political economy of racism and the sociological and the psychological aspects of race relations in America, with specific reference to the differences and intersections of race, class, gender, and ethnicity.]

[AS&RC 283 History of Resistance Movements in Africa and the Diaspora @ (III)
Fall. 3 credits. Not offered fall 2001.
D. Ohadike.
This course deals with the history of resistance and liberation movements in Africa, Brazil, the Caribbean, and the United States. It is concerned with the dialectical relationships between European domination and Black resistance. It examines the methods, strength, and complexity of Black resistance and liberation, together with the rise of revolutionary classes in Africa and the Diaspora. It draws attention to the importance of unity and organization in resistance and then shows similarities, connections, and continuities in Black resistance. Finally, it demonstrates that African background helped shape the nature of struggles for independence and civil liberties in the Caribbean, Brazil, and the United States.]

AS&RC 290 The Sociology of the African-American Experience (III)
Fall. 3 credits. J. Turner.
This is an introductory course to the field of Africana Studies. It assumes a historical/sociological approach to the examination of the African-American experience. The course surveys the African beginnings of human kind and the classical role of Black people in world civilization and the making of early culture. The course treats issues in the humanities, social sciences, and history. The course is required for all undergraduate students majoring at the Africana Center.

AS&RC 304 African American Art (IV)
Spring. 3 credits. S. Hassan.
This course investigates the different forms of African-American visual artistic traditions in relation to their historical origins and socio-cultural context from the early days of slavery to the present time. The course starts with an overview of African art and the experiences of the Middle Passage and slavery in relation to African-American traditions in the decorative arts including: pottery, architecture, ironwork, quiltmaking, and basketry. This is followed by a fine art survey starting with the eighteenth and nineteenth centuries, continuing through the early twentieth-century Harlem Renaissance up to the present. Certain issues related to African-American arts and creativity such as "improvisation," "Black Aesthetic," and "Pan Africanism" are also explored. Slides, films, and film strips are used extensively to illustrate topics discussed. Visits to museums and relevant current exhibitions may be arranged.

[AS&RC 310 Art in African Culture and Society @ (IV)
Fall. 3 credits. Not offered fall 2001.
S. Hassan.
This course is a survey of the visual art and material cultural traditions of sub-Saharan Africa. It aims at investigating the different forms of visual artistic traditions in relation to their historical and sociocultural context. The symbolism and complexity of traditional African art are explored through the analysis of myth, ritual, and cosmology. In-depth analysis of particular African societies is used to examine the relationship of the arts to indigenous concepts of time, space, color, form, and sociopolitical order. New and contemporary art forms associated with major socioeconomic changes and processes of assimilation and acculturation are also explored. These include tourist art, popular art, and elite art.]

AS&RC 311 Government and Politics in Africa @ (III)
Fall. 3 credits. A. Mazrui.
This course deals with power and political participation in Africa. Topics include: the colonial background and its political consequences; the pre-colonial continuities in the post-colonial politics; ethnicity and allegiance in the African polity; and the monarchical tendency in African political culture. Discussion covers a spectrum of

topics from the warrior tradition to the military coup in the post-colonial era; from the elder tradition to presidential gerontocracy; from the sage tradition to intellectual meritocracy. Other major topics include class *versus* ethnicity in African politics; the one-party *versus* the multiparty state; socio-cultural *versus* socio-economic ideologies; the gender question in African politics; the soldier and the state; and the African political experience in a global context.

AS&RC 352 Pan-Africanism and International Politics (III)
Spring. 3 credits. L. Edmondson.
Pan-Africanism addresses the shared experiences and aspirations of African people around the world, focused on a search for greater linkages and unifying measures. Informed by an exploration of the racial factor in international relations, this course examines Pan-African theories, ideologies, and movements, past and present, in their political, socio-economic, and cultural manifestations, focusing mainly on the African continent, the Caribbean, and Black America.

[AS&RC 362 Global Perspectives on Gender
Spring. 4 credits. Not offered 2001–2002. N. Assié-Lumumba.
The course examines how forms of gender inequality have been shaped by international forces and structured by differences in national histories. The class is taught by a rotating set of two faculty members from different departments. Contingent on the particular faculty member directing the course, the class considers such issues as cross-cultural perspectives on gender; the history of work and family life in different societies; the gendered division of labor in local, national, and international economies; the impact of colonialism; the organized efforts of women to define gender relations; and the role of the state in constructing an engendered economy and polity.]

AS&RC 380 African History: Earliest Times to 1800 # @ (III)
Fall. 3 credits. A. Bekerie.
As the second largest continent with vast and varying geographical and sociocultural conditions combined with recently established fact as an original home of human species, Africa provides rich and diverse oral and written early history. The course covers some of the major historical signposts from the origins of human species to 1800. Among the topics for discussion are: Historical Perspectives and Sources, The Nile River Cultural Complex, Berber, Carthage and Maghreb of North Africa, Upper Guinea and Western Sudan of West Africa, Cities of the East African Coast, and Great Zimbabwe and other sites of Southern Africa.

[AS&RC 381 African History, 1800–Present @ (III)
Spring. 3 credits. Not offered spring 2002. D. Ohadike.
This is a survey of African history in the nineteenth and twentieth centuries. It deals with African revolutions in the nineteenth century; the ending of the slave trade and the politics of the abolition; European scramble and partition of Africa; resistance to European colonial conquest; African societies in the colonial period; the politics of decolonization; Neo-colonialism; the rise and decline of military regimes; African debt crisis; and conflict and reconciliation in Africa.]

AS&RC 404 Afrocentricity: Paradigm and Critical Readings (III)
Fall. 4 credits. A. Bekerie.
What is Afrocentricity? It is a theoretical framework designed to study and interpret the histories and cultures of peoples of Africa and African descent by locating them at the center of their experiences. In other words, it is a method of knowing the life experiences of African peoples from the inside out. The course examines—through the writings of Asante, Keto, Clarke, Jean, Myers, Amin, Mazrui, Gates, Appiah, Richards, Schlesinger, and T'hiongo—the conception and depth of the paradigm, its relevance in the production and utilization of knowledge, particularly emancipatory knowledge, the history of the paradigm, and the debate it generates among a wide range of thinkers and scholars.

AS&RC 410 African American Politics (III)
Spring. 4 credits. J. Turner.
The central thesis of African American politics has been its movements for political change and democratic access and human rights. This development since the seventeenth century is a complex political legacy. This course conducts a close study of African American political practice and theoretical analysis of the American political system. Implications of the political systems for prospects and limitations to participation by Black people are analyzed. Critical historical stages in the process of Black politics are examined. The development of electoral offices in federal and statewide politics, and the significant urban political power bases giving rise to African American mayoralty politics in critical industrial centers, as well as rural hamlets, center the course. Presidential politics—the Jesse Jackson campaigns—and new political formations including Black Republicans/conservatives constitute the emphasis on contemporary events. The course reviews the development of the literature in African American politics.

AS&RC 420 Public Policy and the African-American Urban Community (III)
Spring. 4 credits. J. Turner.
The socioeconomic conditions of the African-American urban community are the central focus of the course. Community development models are explored in relationship to the social needs of the African-American population. The changing configuration of internal organization of the African American community nationally is examined.

AS&RC 422 African Literature @ (IV)
Spring. 4 credits. A. Adams.
With such great focus, both inside and outside Africa, on issues of Africa's "development," what place does "literature" take? Is African literature influencing or influenced by the mundane realities of daily living faced by African people? Or does African literature concern itself with philosophical ideas and ideals that transcend those realities to embrace the general human condition? Or, does it do both? The texts that we read in this course are approached in terms of these issues of "African development" and "the universal human experience."

AS&RC 435 African Cinema (also S HUM 435) @ (IV)
Fall. 4 credits. S. Hassan.
This course offers an overview of African cinema and filmmaking. It surveys historically the evolution of African cinema from its early days to the present. Through screening of selected African films, different trends within African cinema are explored, such as "Return to the Sources" and the rediscovery of the pre-colonial past; the "Social Realist" narrative and critique of post-independence Africa; reconstructing the story of colonialism from the perspective of the colonized; and the entertainment genre. Techniques, styles, and aesthetics of African cinema are also discussed. The course offers a unique opportunity of looking at African culture and society, and at issues of social change, gender, class, tradition, and modernization through African eyes.

AS&RC 451 Politics and Social Change in the Caribbean @
Fall. 4 credits. L. Edmondson.
A study of the historical, geostrategic, political, economic, and social (including racial and cultural) forces affecting the domestic and international experiences of Caribbean societies. Special attention is given to conflicting definitions and perceptions of the Caribbean; contending theories of Caribbean social structure and models of development; the continuing salience of struggles for change and transformation; prospects of regional integration; and Caribbean challenges to the global system, especially with regard to the region's relations with the United States and the region's position in the Third World in the context of the North-South cleavage.

AS&RC 455 Caribbean Literature @ (IV)
Fall. 4 credits. A. Adams.
This course examines the prose literature of the Caribbean islands. Through the reading of several novels and short stories from the various languages and cultural strains that comprise the Caribbean societies, students study the points of commonality and the diversity within this body of literature. The recurrence of certain historical, social, and cultural issues that have formed the multi-ethnic Caribbean peoples are analyzed in their varying manifestations across the linguistic and other boundaries to uncover the underlying shared experience.

AS&RC 459 Education in Africa and the Diaspora @ (III)
Fall. 4 credits. N. Assié-Lumumba.
This course deals with educational innovations geared to promoting equal opportunity based on gender, race, and class in Africa and the African diaspora. After an introduction on the concepts of education and innovations and the states of innovation as planned change, the course focuses on concrete historical and contemporary cases of educational innovations. The case studies in the United States include the creation and expansion of historically black institutions such as Lincoln University, Spelman College, Tuskegee Institute (now Tuskegee University), and other schools in the South, and the Westside Preparatory School in Chicago. The African cases studied include African languages for instruction with a focus on a Nigerian case, Ujamaa and education for self-reliance in Tanzania, and the case of Cote d'Ivoire which adopted television as a medium of instruction.

AS&RC 468–469 Honors Thesis
Hours TBA. 468, fall; 469, spring. Africana Center faculty.
For senior Africana Studies majors working on honors theses, with selected reading, research projects, etc., under the supervision of a

member of the Africana Studies and Research Center faculty. Permission of the AS&RC director of undergraduate studies is required.

AS&RC 475 Black Leaders and Movements in African-American History (III)
Fall. 4 credits. R. Harris.
The course analyzes the personalities, ideas, and activities central to the struggle for African-American liberation from the eighteenth century to the present. It examines theories of leadership and the structure of protest movements with the goal of understanding current leadership needs and trends among African Americans.

[AS&RC 478 Family and Society in Africa @ (III)
Fall. 4 credits. Not offered fall 2001.
N. Assié-Lumumba.
The family as a social institution is structured according to socio-economic, historical, political, and cultural specificities. This is the frame in which the family in Africa and the African diaspora must be analyzed. The topics discussed in this course include the concepts of nuclear and extended family, the place and role of different age groups and generations in the family, marriage and its related issues, parenthood, childrearing, gender roles, class differences, and "family planning." This course also deals with the impact of westernization, urbanization, and modern economy on the structure of the family in Africa as well as the legacy of African family values in the African diaspora with a focus on the African-American case.]

AS&RC 479 Women and Gender Issues in Africa @ (III)
Spring. 4 credits. N. Assié-Lumumba.
There are two contrasting views of the status and role of women in Africa. One view portrays African women as dominated and exploited by men. According to another view women have a favorable social position in Africa: indigenous ideologies consider women to be the foundation of society, they are economically active and independent and they have an identity independent of men. In this seminar we discuss the status and role of women in Africa historically as well as in the contemporary period. Among the topics covered are: women in non-westernized/pre-colonial societies; the impact of colonial policies on the status of women; gender and access to schooling, participation in the economy and politics; women and the law; women and health issues; gender issues in southern Africa; womanism and feminism; the United Nations Decade of Women; and the four World Conferences on Women (Mexico 1975, Copenhagen 1986, Nairobi 1985, and Beijing 1995).

[AS&RC 483 History of African Political Thought @ # (III)
Fall. 4 credits. Not offered fall 2001.
D. Ohadike.
The purpose of this course is to provide students with a thorough knowledge of the history of African political thought and ideologies, from ancient times to the present. The course is divided into two broad sections. The first section looks at the history of African political thought and institutions in ancient and near modern times and explains the functioning of African communalism. It then goes on to show how western political thought in the nineteenth and early twentieth centuries instigated the revival of such ideas as Uhuru, Negritude, and African Humanism. The second section examines the history of anti-colonial political thought. It explains why the colonial intelligentsia and radical African nationalists developed such political ideologies as African socialism, Lumumbism, and Nkrumaism. The course also looks at socio-political thought in African literature, and explores the contributions of African religious thought (like Kimbanguism and Tokoism) to the development of African political culture. Among the works of the major African political thinkers to be studied are those of Casely Hayford, Leopold Sédar Senghor, Simon Kimbangu, Amilcar Cabral, Frantz Fanon, Kwame Nkrumah, Patrice Lumumba, Nnamdi Azikiwe, Julius Nyerere, Jomo Kenyatta, Nelson Mandela, and Steve Biko.]

AS&RC 484 Politics and Social Change in Southern Africa @ (III)
Spring. 4 credits. L. Edmondson.
This course focuses on the legacies of apartheid and the challenges of transformation toward a post-apartheid society in South Africa. Topical emphases include: the rise and decline of apartheid; the historical continuity of Black resistance against racism; women under, against, and after apartheid; South Africa's relations with its neighbors; geo-political, economic, and racial dimensions of the American connection; politics of negotiation and transition to majority rule; prospects for stability, democracy, and equality; and South Africa's new role in the African continental and global arenas. Instructor's lectures are supplemented by films and class discussions.

AS&RC 498–499 Independent Study
498, fall; 499, spring. Hours TBA. Africana Center faculty.
For students working on special topics, with selected reading, research projects, etc., under the supervision of a member of the Africana Studies and Research Center faculty.

AS&RC 501 Global Africa: Comparative Black Experience
Spring. 4 credits. A. Mazrui.
This seminar addresses two diasporas in the Black experience. The *diaspora of enslavement* concerns slaves and descendants of slaves in both the Western and Eastern Diaspora. The *diaspora of colonization* concerns demographic dispersal as a result of colonialism. The majority of African- Americans are part of the Diaspora of Enslavement. Recent Algerian immigrants into France are part of the Diaspora of Colonization. Jamaicans and Trinidadians in Britain are part of a *double diaspora*—products of both enslavement and colonialism. The course addresses these areas of Black comparison: Comparative Slavery—A Triple Heritage; Race and Race Mixture in Four Traditions; Comparative Emancipation from Slavery; Comparative Liberation from Colonialism; Comparative Struggle for Civil Rights; The Gender Question in Global Africa; and Comparative Quest for Global Equality.

[AS&RC 502 Education and Development in Africa
Spring. 4 credits. Not offered spring 2002.
N. Assié-Lumumba.
In the 1950s and 1960s, the human capital theory that emphasizes the importance of formal education for achievement of full productive potential of individuals and countries enjoyed a renewed popularity. African countries promoted educational expansion with the expectation that it would lead to socio-economic development. The initial euphoria, however was followed by skepticism and then disillusion. Education began to be perceived even as a hindrance to development. This course examines the relationship between formal education and individual and national development. In this seminar, different paradigms of development including modernization and dependency theories and Third World Forum are presented with an emphasis on the perceived and actual roles of education in individual and national development.]

[AS&RC 503 African Aesthetics
Fall. 4 credits. Not offered fall 2001.
S. Hassan.
The goal of this course is to investigate in depth the principles of aesthetics and philosophy of African visual arts. The course offers a critical survey of the different writings and the growing body of research on this relatively new area of inquiry. The objectives of the course are to review how African aesthetics have been studied to date, to provide a critical analysis of the different approaches to the subject and related issues, and to suggest future directions of research. In-depth analysis of particular African societies is used to examine the relationship of arts and aesthetics to indigenous concept of time, space, color, form, and sociopolitical order. In addition, issues related to African aesthetics and arts such as style, gender, class, and social change are also explored.]

AS&RC 504 Political Change in Africa
Fall. 4 credits. A. Mazrui.
The study of Africa can be approached dialectically (focusing on the tension between opposing forces) or thematically (focusing on themes as chapters of experience). This course borrows from both those approaches. In their class assignments and examinations students are free to use either approach. The first approach explores the dialetic between continuity and change; tradition and modernity; dependency and liberation; foreign and indigenous influences; anarchy and order; political decay and political development; democracy and authoritarianism; and socialism and capitalism. The thematic approach examines African Nationalism; race consciousness and Pan-Africanism; political parties and interest groups; executive power; ethnicity in politics; class-formation; civil-military relations; economic and cultural dependency; sub-regional and continental Pan-Africanism; crisis of the African state; and Africa in World Politics.

[AS&RC 510 Historiography and Sources: The Development of African-American History
Spring. 4 credits. Prerequisite: upperclass or graduate standing or permission of instructor. Not offered 2001–2002.
R. Harris.
The course studies the way Black historians in particular have explained the African-American past. It examines the development of writing African-American history during the twentieth century, and seeks to determine the principles for interpreting African-American history. Participants are acquainted with the methodologies and sources central to understanding the African-American experience.]

AS&RC 530 Womanist Writing in Africa and the Caribbean
Spring. 4 credits. A. Adams.
Theoretical essays on the nature, relevance, and articulation of feminist thought from African and Caribbean writers complement literary texts. Gender issues, as manifested both at home and in emigrant situations abroad are examined in texts by such writers as Sistren, Conde, Dangarembga, Aidoo, Warner-Vieyra, Ba, Emecheta, Kincaid, and W. Mandela. (Francophone works may be read in the original by individuals who so desire.)

AS&RC 598–599 Independent Study
598, fall; 599, spring. Variable credit. For graduate students.

AS&RC 601–602 Africana Studies Graduate Seminar
601, fall; 602, spring. 4 credits. Africana Studies faculty.
This course, which is conducted as a seminar, is designed for first-year AS&RC graduate students. It id coordinated and supervised by one professor but team-taught by three or four faculty members per semester. Each participating faculty member is responsible for a topical *segment* of the course related to her/his areas of specialization or an area of interest pertaining to theory and methodology of Africana Studies.

AS&RC 698–699 Thesis
698, fall; 699, spring. Limited to Africana Studies and Research Center graduate students.

Agriculture, Food, and Society Concentration

A. G. Power, coordinator; G. Altschuler, M. J. Esman, C. C. Geisler, A. Gillespie, B. Ginsberg, D. J. Greenwood, S. L. Kaplan, D. R. Lee, T. J. Lowi, T. A. Lyson, P. L. Marcus, P. McMichael, V. Nee, D. I. Owen, D. Pimentel, N. T. Uphoff, D. Usner. Office: 275 Clark Hall, 255–6042.

Agriculture, Food, and Society is an interdisciplinary concentration that is designed to introduce students to the study of agricultural and food issues from diverse perspectives within the liberal arts. The Agriculture, Food, and Society concentration seeks to make available to students a coherent program of study in which the role of agriculture in modern or prehistorical-historical and developed or developing societies can be understood in biological, social, scientific, and humanistic perspectives. The concentration draws on courses in several colleges—in particular, the Colleges of Arts and Sciences, Agriculture and Life Sciences, and Human Ecology.

The concentration is administered by a committee, the members of which are drawn from the faculty associated with the concentration. The members of this committee include faculty from each of the major colleges from which courses in the concentration are drawn. The work of the committee is supported administratively through the Biology and Society Major. The office of the Biology and Society Major (275 Clark Hall) also provides a central location for students to receive information about relevant course offerings, upcoming seminars and presentations, faculty interests, and so on.

Basic Requirements

The requirements for the Agriculture, Food, and Society concentration are designed to ensure a broad background in the biological, socioeconomic, and humanistic dimensions of agricultural and food issues. These requirements include foundation courses in biology; the Senior Seminar B&SOC/BIO G/S&TS 469, Food, Agriculture, and Society; plus a minimum of five electives totaling 15 credits drawn from the courses offerings.

Students enrolling in the Agriculture, Food, and Society concentration should take the following foundation courses in biology to prepare themselves for course work in agricultural science: a two-semester introductory biology sequence selected from Biological Sciences 109/110, 105/106, or 101–104. (Advanced placement in biology with a score of 4 or 5, or Biological Sciences 107/108, offered during the eight-week Cornell summer session, also satisfies the biological sciences requirement). These courses may be used to meet group 1 (physical or biological sciences) distribution sequence requirements in the College of Arts and Sciences.

It is recommended (but not required) that students in the Agriculture, Food, and Society concentration elect one or more freshman writing seminars with agriculturally related content to meet basic college requirements for graduation. The electives for the concentration, from which a minimum of five courses and 15 credits must be taken, are organized into three groups: agricultural and nutritional science, humanities, and social science/history. Students must select one agricultural and nutritional science course, one humanities course, and three social science or history courses. A maximum of six of the 15 credits may be earned in 100-level courses.

In addition, students are required to take the senior seminar, B&SOC/BIO G/S&TS 469, Food, Agriculture and Society. Adjustments to these and other requirement of the concentration may be made with the approval of the student's Agriculture, Food, and Society faculty adviser.

American Studies

N. Salvatore, acting director; G. Altschuler, P. Becker, R. Bensel, S. Blumin, T. Borstelmann, M. P. Brady, J. Brumberg, J. E. Gainor, M. C. Garcia, M. Kammen, I. Kramnick, T. J. Lowi, B. Maxwell, D. E. McCall, L. L. Meixner, R. L. Moore, M. B. Norton, R. Polenberg, S. Pond, J. Porte, J. Rabkin, S. Samuels, M. E. Sanders, V. Santiago-Irizarry, M. Seltzer, M. Shefter, J. H. Silbey, H. Spillers, D. Usner, M. Washington, S. Wong.

Affiliated faculty: J. E. Bernstock, H. Gottfried, M. Hatch, L. Herrin, J. Jennings, P. McClelland, J. Peraino, P. Sawyer, M. Woods.

The Major

The major in American Studies, appropriate for a wide array of future professions, began as a program of coordinated study in the history, literature, and politics of the United States. These remain the core elements, but American Studies aims to be inclusive in its subject matter. Given the nation's diverse population and cultures, the program wants its majors to examine American experience in broad terms, drawing on the materials and methods of a variety of disciplines.

The prerequisites are two courses from the following: AM ST 101, AM ST 102, AM ST 109, AM ST 110, ENGL 240, ENGL 262, ENGL 265, ENGL 275, GOVT 111, HIST 101, HIST 102, HIST 260, HIST 261. Students normally complete the prerequisite courses by the end of their sophomore year, but they may sign up for the major while enrolled in one of the courses. Students with a score of 5 on the AP exam in American history may use that credit to satisfy HIST 102.

Students who contemplate becoming an American Studies major are encouraged to speak with the program director as early as possible to arrange for a major adviser.

In consultation with their advisers, American Studies majors elect, in addition to the prerequisites, nine courses above the 100 level chosen from the American Studies course list (these courses are usually crosslisted with another department). Their work must include courses in all of the three large periods into which the nation's development can be divided (colonial, nineteenth century, and twentieth century). Students must take no fewer than four courses before 1900. At least one of these courses must be in the period before 1800. Each student must also take one of AM ST 430 seminars or, an appropriate substitute seminar at the 400 level. (AM ST 500/501 taught in Washington, DC, does not fulfill the seminar requirement.) Students are given considerable freedom in creating a balanced program, but no more than five courses may be in any one department.

Beyond the basic core requirements for the major, two courses of work in the history or literature of a culture outside the United States are required. Students who study abroad for one semester usually satisfy this requirement.

Students may find courses relevant to American experience that they wish to take but that are not on the American Studies course list. With their adviser's approval, students may count two such courses towards fulfilling the major.

Honors

Candidates for honors must maintain an average of B+ in courses pertinent to the major and have taken at least one course in which they wrote a research paper. Normally, at the end of the junior year students who wish to write a senior honors essay must approach a member of the American Studies Program faculty and discuss their ideas for a project. With approval from the faculty member students may then register in the fall of their senior year for AM ST 493, the honors essay tutorial. At the end of the fall semester, honors candidates will meet with their adviser and a second member of the American Studies faculty to discuss their progress. If satisfactory, honors students will complete their honors essays in the spring by enrolling in AM ST 494.

Prerequisite Courses (see also under appropriate departments)

[AM ST 101 Introduction to American Studies: History and Literature, the Nineteenth Century # (III)
4 credits. Not offered 2001–2002; next offered 2002–2003. G. Altschuler and D. McCall.

In this interdisciplinary course we analyze American values and behavior as the intersection of culture, politics, literature, and society. We do so by examining eight "great" or classic texts written between 1776–1900. The historical context of these texts is explored in lecture and they are treated as literature and historical/cultural documents. Texts include: *Common Sense* by Thomas Paine; *The Blithedale Romance* by Nathaniel Hawthorne; The Lincoln-Douglas Debates; Henry James' *The Bostonians*; Mark Twain's *Huckleberry Finn*; and William Dean Howells' *The Rise of Silas Lapham*.]

[AM ST 102 Introduction American Studies: History and Literature, the Twentieth Century (III)
4 credits. Not offered 2001–2002; next offered 2002–2003. G. Altschuler and D. McCall.
In this interdisciplinary course we analyze American values and behavior as the intersection of culture, politics, literature, and society. We do so by examining eight "great" or classic texts written between 1900 and the present. Texts include: Ernest Hemingway's *A Farewell to Arms*; F. Scott Fitzgerald's *The Great Gatsby*; William Faulkner's *Sound and the Fury*; Richard Wright's *Black Boy*; John Updike's *Rabbit Run*; and Philip Roth's *American Pastoral*. AM ST 101 is not a prerequisite of AM ST 102.]

AM ST 109 Introduction to American Studies: New Approaches to Understanding American Diversity, the Nineteenth Century # (III or IV)
Fall. 4 credits. N. Salvatore.
This course examines the first century-and-one-half of American national life and asks a series of interrelated questions about the changing meaning of national identity during this time. What did it mean to become an American, a process often urged on new immigrants, in light of the values and perceptions immigrants brought with them? What did democracy, a core element of becoming that American, mean if one were African or Native American? Irish or German? Jewish or Chinese? In what ways did racial and ethnic perceptions help structure political and cultural life during this period; and how does understanding the diverse historical reactions to these perceptions aid us in understanding the complexity of American life? This is an interdisciplinary course in which students analyze historical, literary, and cultural evidence in exploring these and other issues.

[AM ST 110 Introduction to American Studies: New Approaches to Understanding American Diversity, the Twentieth Century (also LSP 110) (III or IV)
Spring. 4 credits. Not offered 2001–2002. M. C. Garcia.
This course examines American national life in the twentieth century and asks questions about the changing meaning of national identity. What does it mean to be an American in the twentieth century? What does it mean to assimilate: Can one assimilate structurally and yet maintain a distinct cultural identity? In what ways do racial and ethnic perceptions structure political, economic, and cultural life? This is an interdisciplinary course in which students analyze historical, literary, and cultural evidence in exploring these and other issues.]

American Studies 430 Seminars

Section One: The Politics of the American Civil War (also GOVT 408)
Spring. 4 credits. Prerequisite: permission of instructor. R. Bensel.
The Civil War, along with the founding of the nation in the late eighteenth century, is one of the two most important influences on the course of American Political development. Arising out of intense ideological, cultural, and economic competition between the slave South and the free labor North, the conflict created two new national states: a northern Union that replaced the loose federation of the antebellum period and a southern Confederacy that perished at Appomattox. In this course, particular attention is paid to: the political economy and culture of plantation slavery in the antebellum South; the apparent inevitability of collision between the slave and free states and their respective societies; the military, political, and economic strategies that determined, on both sides, the course and duration of the war; the limits and possibilities of reform of southern society during Reconstruction; and the impact of the Civil War on the subsequent development of the United States.

Section Two: The Four Seasons Motif in American Culture (also S HUM 405 and HIST 455)
Fall. 4 credits. Prerequisite: permission of instructor. M. Kammen.
The focus of this seminar is one of the most ubiquitous and pervasive motifs in all of the arts (painting, literature, and music) in the northern hemisphere, both West and East: **The Four Seasons**. We view works of art and films, read fiction, non-fiction, and poetry, and listen to music. Although we must devote serious attentions to the Old World origins, dispersion, and local permutations of this motif, more than half of the seminar is given over to American manifestations and writings about the seasons, with particular attention to changes over time as well as geographical variations.

Section Three: Literature as History: The Americas (also ENGL 430)
Fall. 4 credits. Prerequisite: permission of instructor. B. Maxwell.
Beginning with William Carlos Williams's *In the American Grain* (1925), this course considers modernist innovations in the telling of history by literary means. Responding to what they felt as the "deadness" of conventional historiography, writers such as Williams, Charles Reznikoff, John Sanford, Muriel Rukeyser, Melvin Tolson, and Paul Metcalf produced imaginative American histories that made a new world of historical narration, and in the process found new objects of historical attention. One of these was the plural, transnational America of the hemispheric Americas. This reconfiguration anticipated and in some cases shaped recent revisionist critiques of the European presence on American soil (Eduardo Galeano, Leslie Marmon Silko, David Stannard, Ward Churchill, Noam Chomsky, Ana Castillo); accordingly students read examples, some polemical, of that later work.

Section Four: Detroit: Nowhere to Run, Nowhere to Hide
Spring. 4 credits. Prerequisite: permission of instructor. N. Salvatore.
Detroit has been a national symbol of urban decay for many decades. The devastating violence in 1967 created as well a widespread national belief that this largely African-American population could not successfully adapt to contemporary urban life. Yet those images conflict with others of even longer standing, of Detroit, Motown, as a source of national culture; of progressive, interracial unionism; of a strong black religious community; and of the city as an incubator of diverse movements supporting black nationalism, civil rights, and black entrepreneurship. Taking our lead from one of Martha and the Vandellas' great hits, we explore these multiple images and the even more complex realities of this city during the post-1945 era. We do so, moreover, in an interdisciplinary fashion that seeks to understand images of Detroit in the context of national events.

Anthropology, Sociology, and Economics

[AM ST 150 Introduction to American Religion (also SOC 150 and RELST 150) (III)
3 credits. Not offered 2001–2002. P. Becker.
For description, see SOC 150.]

[AM ST 203 Religion and Family in the U.S. (also SOC 201, R SOC 202, RELST 203) (III)
3 credits. Not offered 2001–2002. P. Becker.
For description, see SOC 201.]

[AM ST 221 Anthropological Representation: Ethnographies of Latino Culture (also ANTHR 221 and LSP 221) (III)
Spring. 3 credits. Not offered 2001–2002. V. Santiago-Irizarry.
For description, see ANTHRO 221.]

AM ST 307 Equality and Dominance: Historical Ethnography of the United States before 1900 (also ANTHR 301) # (III)
Spring. 4 credits. D. Doukas.
For description, see ANTHR 301.

AM ST 323 American Economic History (also ECON 323) # (III)
Spring. 4 credits. P. McClelland.
For description, see ECON 323.

AM ST 377 The United States (also ANTHR 377 and LSP 377) (III)
Fall. 4 credits. V. Santiago-Irizarry.
For description, see ANTHRO 377.

[AM ST 380 Gender, Ideology, and Culture (also SOC 380 and WOMNS 380) (III)
Not offered 2001–2002. 4 credits. P. Becker.
For description, see SOC 380.]

Literature and Theatre Arts

[AM ST 215 Comparative American Literature (also COM L 215) (IV)
Spring. 4 credits. Not offered 2001–2002. B. Maxwell.
For description, see COM L 215.]

[AM ST 240 Survey in U.S. Latino Literature (also ENGL 240) (IV)
4 credits. Not offered 2001–2002. M. P. Brady.
For description, see ENGL 240.]

AM ST 252 Twentieth-Century Women Novelist (also ENGL 251) (IV)
Spring. 4 credits. S. Samuels.
For description, see ENGL 251.

AM ST 262 Asian American Literature (also ENGL 262, AAS 262) (IV)
Spring. 4 credits. S. Wong.
For description, see ENGL 262.

AM ST 266 Asian American Women and Literature (also AAS 266, ENGL 266) (IV)
Fall. 4 credits. S. Dave.
For description, see AAS 266.

AM ST 268 The Culture of the 1960s (also ENGL 268) (IV)
Spring. 4 credits. P. Sawyer.
This course argues that the 1960s helps define the 1990s, but that as we look back, the 1990s helps define the 1960s. Were the sixties a time of dangerous experimentation with drugs, sex, and alternative lifestyles on the part of a pampered generation that gradually learned to straighten up and join the mainstream? Or was it a time of revolutionary hopefulness, when the civil rights movement and the Vietnam War stimulated an empassioned critique that changed American society? What can the experiences of young "boomers" contribute to a later generation, the last of the twentieth century? The course explores these and other questions by focusing on the topics of racial justice, war, the counterculture, the New Left, and the woman's movement. Texts include *The Autobiography of Malcolm X, The Electric Kool-Aid Acid Test, Dispatches*, the poems of Allen Ginsburg and Adrienne Rich, films, music, speeches, manifestoes, and memoirs. The term paper explores students' special interests.

[AM ST 275 The American Literary Tradition (also ENGL 275) (IV)
Fall. 4 credits. Not offered 2001–2002. H. Spillers.
The problem of an American national literature is explored through the reading, discussion, and close analysis of texts across the range of American literary history. Not a survey, this course focuses on the relations of the texts to each other, the shaping of national identities in those relationships, and the assumptions about history, language, and the self that underlie them.]

[AM ST 276 Literature in the Cold War Culture (also ENGL 276) (IV)
Not offered 2001–2002. B. Maxwell.
For description, see ENGL 276.]

[AM ST 291 American 1920s: Literature and Culture (also ENGL 291) (IV)
Fall. 4 credits. Not offered 2001–2002. B. Maxwell.
For description, see ENGL 291.]

[AM ST 318 Queer Theatre (also THETR 320) (IV)
4 credits. Not offered 2001–2002. E. Gainor.
For description, see THETR 320.]

AM ST 326 Imagining America: French Travel Writing from de Tocqueville to Baudrillard (also FR LIT 324) (IV)
Fall. 4 credits. D. Rubenstein.
For description, see FR LIT 324.

AM ST 334 American Drama and Theatre (also THETR 336 and ENGL 336) (IV)
Fall. 4 credits. E. Gainor.
For description, see THETR 336.

AM ST 335 Contemporary American Theatre (also THETR 337 and ENGL 337) (IV)
Spring. 4 credits. E. Gainor.
For description, see THETR 337.

[AM ST 338 American Indians and Film (also THETR 338) (IV)
4 credits. Not offered 2001–2002. L. Black.
For description, see THETR 338.]

AM ST 361 Early American Literature (also ENGL 361) # (IV)
Fall. 4 credits. J. Porte.
For description, see ENGL 361.

[AM ST 362 The American Renaissance (also ENGL 362) (IV)
4 credits. Not offered 2001–2002. J. Porte.
For description, see ENGL 362.]

[AM ST 363 The Age of Realism and Naturalism (also ENGL 363) (IV)
Fall. 4 credits. Not offered 2001–2002.
For description, see ENGL 363.]

[AM ST 365 American Literature Since 1945 (also ENGL 365) (IV)
4 credits. Not offered 2001–2002.
For description, see ENGL 365.]

AM ST 366 The Nineteenth-Century American Novel (also ENGL 366) # (IV)
Fall. 4 credits. D. McCall.
For description, see ENGL 366.

AM ST 367 The Modern American Novel (also ENGL 367) (IV)
Spring. 4 credits. D. McCall.
For description, see ENGL 367.

AM ST 368 The American Novel Since 1950 (also ENGL 368) (IV)
Fall. 4 credits. P. Sawyer.
For description, see ENGL 368.

[AM ST 369 Survey of African American Literature to 1917 (also ENGL 375) (IV)
4 credits. Not offered 2001–2002.
For description, ENGL 375.]

AM ST 370 Survey in African American Literature: 1918 to Present (also ENGL 376) (IV)
Spring. 4 credits. H. Spillers.
For description, see ENGL 376.

[AM ST 374 Nineteenth-Century American Women Writers (also ENGL 374 and WOMNS 378) # (IV)
4 credits. Not offered 2001–2002. Staff.
For description, see ENGL 374.]

AM ST 395 Policing and Prisons in American Culture (also ENGL 397) (IV)
Spring. 4 credits. B. Maxwell.
For description, see ENGL 397.

[AM ST 403 Studies in American Poetry: Great Books, 1855–1926 (also ENGL 403) (IV)
Fall. 4 credits. Not offered 2001–2002. R. Gilbert.
For description, see ENGL 403.]

AM ST 461 Asian Americans and Popular Culture (also AAS 461, ENGL 461, THETR 461) (IV)
Fall. 4 credits. S. Dave.
For description, see AAS 461.

[AM ST 465 Proseminar in American Studies (also ENGL 465) (IV)
4 credits. Not offered 2001–2002. J. Porte.
For description, see ENGL 465.]

AM ST 469 William Faulkner (also ENGL 469) (IV)
Fall. 4 credits. H. Spillers.
For description, see ENGL 469.

AM ST 470 Studies in the Novel: Forms of American Fiction: The Short Story as Novel (also ENGL 470) (IV)
Fall. 4 credits. L. Herrin.
For description, see ENGL 470.

[AM ST 473 American Indian Autobiography (also ENGL 473) (IV)
Fall. 4 credits. Not offered 2001–2002. L. Donaldson.
For description, see ENGL 473.]

AM ST 475 Seminar in Cinema I (also THETR 475) (IV)
Fall. 4 credits. D. Fredericksen.
For description, see THETR 475.

[AM ST 479 Jewish-American Writing (also ENGL 479 and JWST 478) (IV)
4 credits. Not offered 2001–2002. J. Porte.
For description, see ENGL 479.]

Government and Public Policy

GOVT 111 Introduction to American Government and Politics (III)
Fall. 3 credits. T. J. Lowi.
An introduction to government through the American experience. Concentration on analysis of the institutions of government and politics as mechanisms of social control.

AM ST 302 Social Movement in American Politics (also GOVT 302) (III)
Fall. 4 credits. M. E. Sanders.
For description, see GOVT 302.

[AM ST 305 Public Opinion and Political Participation (also GOVT 304) (III)
Fall. 4 credits. Not offered 2001–2002. J. Cowden.
For description, see GOVT 305.]

[AM ST 310 Civil Liberties in the United States (also GOVT 327) (III)
4 credits. Not offered 2001–2002. J. Rabkin.
For description, see GOVT 327.]

[AM ST 315 Prisons (also GOVT 314) (III)
4 credits. Not offered 2001–2002. M. Katzenstein.
For description, see GOVT 314.]

[AM ST 316 The American Presidency (also GOVT 316) (III)
Fall. 4 credits. Not offered 2001–2002. M. E. Sanders.
For description, see GOVT 316.]

AM ST 319 The American Congress (also GOVT 318) (III)
Spring. 4 credits. M. Shefter.
For description, see GOVT 318.

[AM ST 328 Constitutional Politics: The United States Supreme Court (also GOVT 328) (III)
4 credits. Not offered 2001–2002. J. Rabkin.
For description, see GOVT 328.]

[AM ST 350 Atomic Consequences: The Incorporation of Nuclear Weapons in Postwar America (also S&TS 350, GOVT 305) (III)
Spring. 4 credits. Not offered 2001–2002. M. Dennis.
For description, see S&TS 350.]

[AM ST 353 Feminism Movements and the State (also GOVT 353, WOMNS 353) (III)
4 credits. Not offered 2001–2002. M. Katzenstein.
For description, see GOVT 353.]

AM ST 376 American Political Thought from Madison to Malcolm X (also GOVT 366 and HIST 316) # (III)
Fall. 4 credits. I. Kramnick.
For description, see GOVT 366.

[AM ST 388 Science in the American Polity, 1800–1960 (also S&TS 390, GOVT 308) (III)
Fall. 4 credits. Not offered 2001–2002. M. Dennis
For description, see S&TS 390.]

AM ST 389 Science in the American Polity, 1960–Now (also S&TS 391, GOVT 309) (III)
Fall. 4 credits. M. Dennis.
For description, see S&TS 391.

[AM ST 409 Racial Prejudice and Political Intolerance (also GOVT 409) (III)
4 credits. Limited to 15 students. Not offered 2001–2002. J. Cowden.
For description, see GOVT 409.]

AM ST 428 Government and Public Policy: An Introduction to Analysis and Criticism (also GOVT 428) (III)
Fall. 4 credits. T. Lowi.
For description, see GOVT 428.

AM ST 429 Government and Public Policy: An Introduction to Analysis and Criticism (also GOVT 429) (III)
Spring. 4 credits. 428 and consent of instructor are required for 429. T. Lowi.
For description, see GOVT 429.

History

AM ST 103 Introduction to American History (also HIST 101) # (III)
Fall. 4 credits. M. B. Norton.
A survey of American history from the beginning through the Civil War. Topics include cultural encounters in the age of Columbus, European colonization, the American Revolution, the early republic, antebellum reform movements, and the coming of the Civil War.

AM ST 104 Introduction to American History (also HIST 102) (III)
Spring. 4 credits. Staff.
An introductory survey of the development of the United States since the Civil War.

AM ST 124 Democracy and its Discontents: Political Traditions in the United States (also HIST 124) (III)
Summer. 3 credits. N. Salvatore.
An examination of democracy and its critics. The course explores the evolution of democracy in America, focusing on some of the dramatic and important episodes in American history. It considers the struggles over the emancipation of slaves in the nineteenth century and expanded rights for women and working people in the twentieth century, free-speech issues, the civil-rights movement, religious-based critiques of American culture, and conservative critiques of American liberalism. The course serves as an investigation of the ways in which political expression takes forms in modern American culture. In addition to lectures, the course features several afternoon programs. These programs include guest lecturers and hands-on instruction in how to use the modern electronic research library.

[AM ST 201 Popular Culture in the United States, 1900–1945 (III or IV)
Fall. 4 credits. Not offered 2001–2002. G. Altschuler.
American Studies 201 deals with American popular culture in the period between 1900 and the end of World War II. As we examine best-sellers, films, sports and television, radio, ads, newspapers, magazines, and music, we try to better understand the ways in which popular culture as "contested terrain," the place where social classes, racial and ethnic groups, women and men, the powerful and the less powerful, seek to "control" images and themes. Topics for 201 include: the Western; Cultural Heroes and the Cult of Individualism in the 1920s; The Hays Code and the Black Sox scandal; Mae West and the "New Women", Advertising in an Age of Consumption; Gangsters and G-Men; and Jackie Robinson and the American Dilemma.]

[AM ST 202 Popular Culture in the United States, 1945–Present (III or IV)
Spring. 4 credits. Not offered 2001–2002. G. Altschuler.
American Studies 202 treats the period from 1945 to the present. As we examine best-sellers, films, sports and television, radio, ads, newspapers, magazines, and music, we try to better understand the ways in which popular culture shapes and/or reflects American values. The course also depicts popular culture as "contested terrain," the place where social classes, racial and ethnic groups, women and men, the powerful and less powerful, seek to "control" images and themes. Topics for 202 include: The "Honeymooners" and 1950s Television, soap operas; "Gross-out" movies;'Elvis; The Beatles, and Guns 'n Roses; Gothic Romances; and People Magazine and USA Today.]

[AM ST 204 Comparative Migration in the Americas (also HIST 202) (III)
Spring. 4 credits. Not offered 2001–2002. M. C. Garcia.
For description, see HIST 202.]

AM ST 208 Seminar: Era-Franklin D. Roosevelt (also HIST 208) (III)
Fall. 4 credits. R. Polenberg.
For description, see HIST 208.

[AM ST 210 Civil Rights and Civil Wrongs: The Search for Racial Justice in America, 1945–1970 (III)
Fall. 4 credits. Not offered 2001–2002. N. Salvatore.
In this seminar we read a variety of texts that underscore the fierce struggle to define the meaning of civil rights in American society during this era. We explore this from multiple perspectives through readings of historical, legal, political, theological, and literary readings.]

AM ST 212 African American Women: Twentieth Century (also HIST 212 and WOMNS 212) (III)
Spring. 4 credits. M. Washington.
For description, see HIST 212.

AM ST 214 Seminar on American Foreign Policy (also HIST 214) (III)
Fall. 3 credits. Prerequisite: permission of instructor. W. LaFeber.
For description, see HIST 214.

AM ST 219 Mexican Immigration to the United States (also HIST 219, LSP 219) (III)
Fall. 4 credits. J. Cardenas.
For description, see LSP 219.

[AM ST 241 History of Childhood in the United States (also HD 241 and HIST 271) (III)
Spring. 4 credits. Not offered 2001–2002. J. Brumberg.
For description, see HD 241.]

[AM ST 251 Black Religious Traditions from Slavery to Freedom (also HIST 251 and RELST 251) (III)
Fall. 4 credits. Not offered 2001–2002. M. Washington.
For description, see HIST 251.]

[AM ST 258 Historical Development of Women as Professionals, 1800 to Present (also HD 258, HIST 238, WOMNS 238) (III)
4 credits. Not offered 2001–2002. J. Brumberg.
For description, see HD 258.]

[AM ST 259 Introduction to U.S. Latino History, Part I (also HIST 260, LSP 260) (III)
4 credits. Not offered 2001–2002. M. C. Garcia.
For description, see HIST 260.]

AM ST 261 Introduction to U.S. Latino History, Part II (also HIST 261, LSP 261) (III)
Spring. 4 credits. M. C. Garcia.
For description, see HIST 261.

[AM ST 272 American Indian History, 1500–1850 (also HIST 276 and AIS 276) # (III)
Fall. 4 credits. Not offered 2001–2002. D. Usner.
For description, see HIST 276.]

[AM ST 273 Women in American Society, Past and Present (also HIST 273) # (III)
4 credits. Not offered 2001–2002. M. B. Norton.
For description, see HIST 273.]

[AM ST 277 American Indian History Since 1850 (also HIST 277 and AIS 277) (III)
Spring. 4 credits. Not offered 2001–2002. D. Usner.
For description, see HIST 277.]

[AM ST 303 African American Women in Slavery and Freedom (also HIST 303) # (III)
Spring. 4 credits. Not offered 2001–2002. M. Washington.
For description, see HIST 303.]

[AM ST 304 American Culture in Historical Perspective, 1880–1980 (also HIST 304) (III)
Spring. 4 credits. Not offered 2001–2002. M. Kammen.
For description, see HIST 304.]

[AM ST 311 Structure of American Political History (also HIST 311) # (III)
Fall. 4 credits. Not offered 2001–2002. J. Silbey.
For description, see HIST 311.]

[AM ST 312 Structure of American Political History (also HIST 312) (III)
Spring. 4 credits. Not offered 2001–2002. J. Silbey.
For description, see HIST 312.]

[AM ST 314 History of American Foreign Policy, 1912 to the Present (also HIST 314) (III)
Spring. 4 credits. Not offered 2001–2002. T. Borstelmann.
For description, see HIST 314.]

AM ST 317 American Constitutional Development (also HIST 318) (III)
Fall. 4 credits. R. Polenberg.
For description, see HIST 318.

[AM ST 320 Understanding Work in America, 1800–1990 (also HIST 315) (III)
4 credits. Not offered 2001–2002; next offered 2003–2004. N. Salvatore.
This course examines both the experience and the perception of work in American life in the century framed by two fundamental formations: the emergence of a system of industrial capitalism largely nationalistic in its orientation and the development of a more international economic system in more recent times. Among the topics considered are the effects of technological change, its impact on the experience of work across numerous occupational categories, and the changing perceptions of work as reflected in contemporary cultural expression, literature, and commentary across the century.]

[AM ST 321 Colonial North America to 1763 (also HIST 321) # (III)
4 credits. Not offered 2001–2002. M. B. Norton.
For description, see HIST 321.]

AM ST 322 Age of the American Revolution, 1763–1815 (also HIST 325) # (III)
Spring. 4 credits. M. B. Norton.
For description, see HIST 325.

[AM ST 324 Varieties of American Dissent, 1880–1990 (also HIST 324) (III)
4 credits. Not offered 2001–2002; next offered 2002–2003. N. Salvatore.
The idea of dissent in American society raises a variety of images. Civil rights activists, striking workers, and student radicals of the 1960s are familiar enough symbols of dissent. But might we understand a Pentecostal believer, filled with the spirit of his or her God in critiquing contemporary society, as an example of American dissent? This course explores the varieties of economic, political, and cultural dissent in American between 1880 and 1990, and examines how understanding dissent in its specific historical context illuminates major aspects of American life and culture.]

[AM ST 327 American Frontier History before 1850 (also HIST 327) # (III)
4 credits. Not offered 2001–2002. D. Usner.
For description, see HIST 327.]

AM ST 329 Indians, Settlers, and Slaves in the Early South (also HIST 329, AIS 329) # (III)
Spring. 4 credits. D. Usner.
For description, see HIST 329.

[AM ST 330 The Age of Jackson, 1813–1850 (also HIST 330) # (III)
4 credits. Not offered 2001–2002.
For description, see HIST 330.]

AM ST 331 American Civil War and Reconstruction, 1850–1877 (also HIST 331) # (III)
Fall. 4 credits. J. Silbey.
For description, see HIST 331.

[AM ST 332 The Urbanization of American Society, 1600 to 1860 (also HIST 332) # (III)
4 credits. Not offered 2001–2002. S. Blumin.
For description, see HIST 332.]

AM ST 333 The Urbanization of American Society, 1860–2000 (also HIST 333) (III)
Spring. 4 credits. S. Blumin.
For description, see HIST 333.

[AM ST 336 Capitalism and Society in Developing America, 1607–1877 (also HIST 336) # (III)
4 credits. Not offered 2001–2002. S. Blumin.
For description, see HIST 336.]

[AM ST 337 Entrepreneurialism and Organization in the Age of the Corporation: Capitalism and Society in Modern America, 1840–2000 (also HIST 337) (III)
Spring. 4 credits. Not offered 2001–2002. S. Blumin.
For description, see HIST 337.]

[AM ST 340 Recent American History, 1925–1960 (also HIST 340) (III)
Spring. 4 credits. Not offered 2001–2002. R. Polenberg.
For description, see HIST 340.]

AM ST 341 Recent American History, 1960–Present (also HIST 341) (III)
Spring. 4 credits. R. Polenberg.
For description, see HIST 341.

[AM ST 345 Intellectual/Cultural Life of Nineteenth-Century Americans (also HIST 345 and RELST 345) # (III)
Spring. 4 credits. Not offered 2001–2002. R. L. Moore.
For description, see HIST 345.]

[AM ST 346 Modernization of the American Mind (also HIST 346) (III)
4 credits. Not offered 2001–2002. R. L. Moore.
For description, see HIST 346.]

AM ST 347 American Environmental History (also HIST 347) (III)
Fall. 4 credits. F. Dunaway.
For description, see HIST 347.

[AM ST 359 American Families in Historical Perspective (also HD 359 and WOMNS 357)
3 credits. Not offered 2001–2002. J. Brumberg.
For description, see HD 359.]

[AM ST 378 Topics in U.S. Women's History (also HIST 378 and WOMNS 378) (III)
4 credits. Not offered 2001–2002. M. B. Norton.
For description, see HIST 378.]

[AM ST 406 The Immigrant City 1990–2000 (also S HUM 406, LSP 406, and HIST 412) (III)
Fall. 4 credits. Not offered 2001–2002. M. C. Garcia.
For description, see S HUM 406.]

AM ST 411 Seminar: American Political History (also HIST 411) (III)
Spring. 4 credits. Prerequisite: permission of instructor. J. Silbey.
For description, see HIST 411.

[AM ST 417 History of Female Adolescence (also HD 417, HIST 458, WOMNS 438) # (III)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. J. Brumberg.
For description, see HD 417.]

AM ST 419 Seminar in American Social History (also HIST 419) (III)
Spring. 4 credits. Taught in Washington, D.C. S. Blumin.
For description, see HIST 419.

[AM ST 421 Undergraduate Seminar in American Cultural History (also HIST 421) (III)
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. M. Kammen.
For description, see HIST 421.]

AM ST 439 Reconstruction and the New South (also HIST 439) (III)
Fall. 4 credits. Limited to 15 students. M. Washington.
For description, see HIST 439.

[AM ST 440 Undergraduate Seminar in Recent American History (also HIST 440) (III)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. R. Polenberg.
For description, see HIST 440.]

[AM ST 442 Religion and Politics in American History from J. Winthrop to R. Reed (also HIST 442 and RELST 442) (III)
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. R. L. Moore.
For description, see HIST 442.]

AM ST 486 Seminar on the 1960s (also HIST 486) (III)
Fall. 4 credits. Limited to 15 students. T. Borstelmann.
For description, see HIST 486.

AM ST 500 Research Seminar in American Studies (also HIST 500)
Fall or spring. Offered in Cornell-in-Washington Program only. S. Blumin and others.
For description, see HIST 500.

AM ST 501 Politics and Policy: Theory, Research, and Practice (also GOVT 500, ALS 500, and PAM 406)
Fall, spring. Offered in Cornell-in-Washington Program only. S. Jackson.
For description, see GOVT 500.

Music and Visual Studies

AM ST 105 Popular Music in America: 1850–1985 (also MUSIC 101) # (IV)
Spring. 3 credits. S. Pond.
For description, see MUSIC 101.

AM ST 222 A Survey of Jazz (also MUSIC 222) (IV)
Fall. 3 credits. S. Pond.
For description, see MUSIC 222.

[AM ST 223 History of Rock Music (also MUSIC 221) (IV)
Spring. 3 credits. Not offered 2001–2002. J. Peraino.
For description, see MUSIC 221.]

[AM ST 243 Inside Out: The American Everyday Interior (also DEA 243, WOMNS 243)
Spring. 3 credits. Not offered 2001–2002. J. Jennings.
For description, see DEA 243.]

[AM ST 270 Mapping American (also ART H 270) # (IV)
Fall. 4 credits. Not offered 2001–2002. L. L. Meixner.
For description, see ART H 270.]

AM ST 282 The American Landscape (also LA 282)
Fall. 3 credits. H. Gottfried.
For description, see LA 282.

[AM ST 355 U.S. Art from FDR to Reagan (also ART H 365) (IV)
Fall. 4 credits. Not offered 2001–2002. J. E. Bernstock.
For description, see ART H 365.]

AM ST 360 Painting and Everyday Life in Nineteenth-Century America (also ART H 360) # (IV)
Spring. 4 credits. L. L. Meixner.
For description, see ART H 360.

AM ST 390 American Architecture and Building I (also ARCH 390)
Fall. 3 credits. Prerequisites: ARCH 181–182 or permission of instructor. M. Woods.
For description, see ARCH 390.

[AM ST 391 American Architecture and Building II (also ARCH 391)
3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered 2001–2002. M. Woods.]

[AM ST 397 Special Topics in the History of Architecture and Urbanism (also ARCH 398)
3 credits. Prerequisites: ARCH 181–182 or permission of instructor. Not offered 2001–2002. M. Woods.
For description, see ARCH 398.]

[AM ST 462 Topics in Early Modernism (also ART H 462) (IV)
4 credits. Not offered 2001–2002. L. L. Meixner.
For description, see ART H 462.]

Honors

Please see description of major for information about registration in these courses.

AM ST 493–494 Honors Essay Tutorial
493, fall; 494, spring. Up to 4 credits each semester. See R. L. Moore for appropriate advisers.

Center for Applied Mathematics

The Center for Applied Mathematics administers a broadly based interdepartmental graduate program that provides opportunities for study and research over a wide range of the mathematical sciences. This program is based on a solid foundation in analysis, algebra, and methods of applied mathematics. The remainder of the graduate student's program is designed by the student and his or her Special Committee. For detailed information on opportunities for graduate study in applied mathematics, students should contact the Director of Graduate Studies of the Center for Applied Mathematics, 657 Frank H. T. Rhodes Hall.

There is no special undergraduate degree program in applied mathematics. Undergraduate students interested in an application-oriented program in mathematics may select an appropriate program in the Department of Mathematics, the Department of Computer Science, or some department of the College of Engineering.

A listing of selected graduate courses in applied mathematics can be found in the description of the center in "Interdisciplinary Centers, Programs, and Studies."

Archaeology Program

S. Baugher (landscape architecture), R. G. Calkins (history of art), K. M. Clinton (classics), J. E. Coleman (classics), D. Evett (Language House Program), R. T. Farrell (English), K. L. Gleason (landscape architecture), J. S. Henderson (anthropology), K. A. R. Kennedy (ecology and systematics), P. I. Kuniholm (history of art), director of undergraduate studies, D. I. Owen (Near Eastern studies), Joan R. Piggott (history), A. Ramage (history of art), N. Russell (anthopology), B. S. Strauss (history), Michael A. Tomlan (city and regional planning), T. P. Volman (anthropology), Jeffrey R. Zorn (near eastern studies).

Archaeology is an interdisciplinary field at Cornell, which is one of the few universities in the United States to offer a separate archaeology major. Program faculty members, affiliated with several departments, coordinate course offerings and help students identify opportunities for fieldwork, graduate study, and professional positions.

The Major

Prospective majors must complete Archaeology 100 or one of the basic courses as defined below before they will be admitted to the major. This initial course will not be counted toward the major requirements.

Because the major draws on the teaching and research interests of faculty from many departments to present a broad view of the archaeological process, interested students should discuss their course of study with a participating faculty member as early as possible. In some areas of specialization, intensive language training should be coordinated with other studies as early as the freshman year.

Once admitted to the major, students must take at least 32 additional credits from the courses listed below, or from related fields selected in consultation with a major adviser of their choosing. The courses chosen should provide exposure to a broad range of cultures known through archaeology and the methods of uncovering and interpreting them. Sixteen of the credit hours should be at the 300 level or above. At least two courses must be taken from each of the following categories: B. Anthropological Archaeology; C. Classical, Near Eastern, and Medieval Archaeology; and D. Methodology and Technology.

Either ARKEO 481 or ARKEO 482 (Honors Thesis, fall and spring) can count toward the major, but not both. In addition to ARKEO 481 or 482, only four credits of ARKEO 300 (Individual Study) or other supervised study can count towards the major.

Courses basic to the discipline of archaeology are marked with the word "Basic" after the number of credit hours. It is recommended that majors who are planning to pursue graduate studies in archaeology take at least two of the basic courses in each category. Further courses in languages and geology are also recommended.

Honors. Honors in archaeology are awarded on the basis of the quality of an honors essay and the student's overall academic record. Prospective honors students should have at least a 3.5 grade point average in the major and a 3.0 grade point overall. They should consult with the director of undergraduate studies before the beginning of the senior year. The honors essay is normally prepared over two semesters in consultation with a faculty adviser during the senior year; students may enroll in Archaeology 481 (fall) or Archaeology 482 (spring) for this purpose.

Fieldwork. Every student should gain some practical experience in archaeological fieldwork on a project authorized by his or her adviser. This requirement may be waived in exceptional circumstances. The Jacob and Hedwig Hirsch bequest provides support for a limited number of students to work at excavations sponsored by Cornell and other approved institutions.

The Concentration

Students in Cornell schools and colleges other than Arts and Sciences may elect a concentration in archaeology. To concentrate in archaeology, the student must complete five courses, all with a grade of C or better. The five courses must consist of either (1) Archaeology 100 and four other courses from categories B–D (described above), at least three of which must be basic courses, or (2) five courses from categories B–D, at least four of which must be basic courses. Concentrators are encouraged to gain some fieldwork experience. They are eligible for Hirsch Scholarships in support of fieldwork on the same basis as majors.

First-Year Writing Seminars

For course descriptions, see the first-year writing seminar brochure.

A. Introductory Courses and Independent Study Courses

ARKEO 100 Introduction to Archaeology (also ANTHR 100) # @ (III or IV)
Fall. 3 credits. Basic. J. Henderson.
A broad introduction to archaeology: the study of material remains to answer questions about the human past. Case studies highlight the variability of ancient societies and illustrate the varied methods and interpretive frameworks archaeologists use to reconstruct them. This course can serve as a platform for both Archaeology and Anthropology undergraduate majors.

ARKEO 201 Lost Tribes and Sunken Continents (also ANTHR 201) @ #
Summer only. 3 credits. D. Evett.
An examination of popular theories about past highlights, differences among them, and the kinds of explanations offered by archaeologists. Emphasis is on the ways archaeologists interpet the past. Case studies include Atlantis, Stonehenge, Egyptian and Mexican pyramids, and the history of contacts between the Old World and the Americas.

ARKEO 300 Individual Study in Archaeology and Related Fields
Fall and spring. Credit TBA. Prerequisite: ARKEO 100 or permission of instructor.
Students pursue topics of particular interest with the guidance of a faculty member.

ARKEO 481–482 Honors Thesis
481, fall; 482, spring. 4 (V) credits. S-U only. Prerequisite: admission to Honors Program.
The student, under faculty direction, prepares a senior thesis.

ARKEO 600 Special Topics in Archaeology
Fall and spring. 4 (V) credits.
Students pursue advanced topics of particular interest under the guidance of a faculty member(s).

ARKEO 681–682 Master's Thesis
681, fall; 682, spring. 4 (V) credits. S-U only. Limited to students admitted to Master's Program in Archaeology.
Students, working individually with faculty member(s), prepare a Master's Thesis in Archaeology.

B. Anthropological Archaeology

[ARKEO 202 Interpretive Archaeology (also ANTHR 202) (III)
Fall. 3 credits. Basic. Limited to 50 students. Not offered 2001–2002. T. P. Volman.
For description, see ANTHR 202.]

[ARKEO 203 Early People: The Archaeological and Fossil Record (also ANTHR 203) # (III)
Spring. 3 credits. Basic. Not offered 2001–2002. T. P. Volman.]

[ARKEO 204 Ancient Civilizations (also ANTHR 204) @ # (III)
Fall. 3 (4) V credits. Basic. Not offered 2001–2002. J. S. Henderson.]

[ARKEO 215 Stone Age Art (also ANTHR 215) # (III)
Fall. 3 credits. Not offered 2001–2002. T. P. Volman.
For description, see ANTHR 215.]

ARKEO 255 Great Empires of the Andes (also ANTHR 255) @ # (III)
Summer only. 3 credits. M. Malpass.
The Andes region of South America, stretching from northern Colombia to Tierra del Fuego, saw the rise and fall of some of the world's most spectacular societies, from the Moche of the north Peruvian coast to the Incas. Not only were the cultures of this area highly developed, but many of the technologies—metallurgy, textiles, ceramics, and stonemasonry, to name just four—were unusually sophisticated. The Andean region saw the indigenous domestication of plants and animals as well as the rise of state-level societies. This course introduces students to the cultural developments of this fascinating area, from the earliest times to the fall of the Incas in AD 1543.

[ARKEO 317 Stone Age Archaeology (also ANTHR 317) (III)
Fall. 4 credits. Not offered 2001–2002. T. P. Volman.
For description, see ANTHR 317.]

[ARKEO 355 Ancient Mexico and Central America (also ANTHR 355) @ # (III)
Spring. 4 credits. Basic. Not offered 2001–2002. J. Henderson.
For description, see ANTHR 355.]

[ARKEO 409 Approaches to Archaeology (also ARKEO 609 and ANTHR 409/609) (III)
Fall. 4 credits. Basic. Prerequisite: permission of instructor. Not offered 2001–2002. N. Russell.
For description, see ANTHR 409.]

[ARKEO 459 Archaeology of the Household (also ARKEO 659 and ANTHR 459/659) (III)
Fall. 4 credits. Not offered 2001–2002. J. Henderson and N. Russell.
For description, see ANTHR 459.]

[ARKEO 466 Humans and Animals (also ARKEO 666 and ANTHR 466/666) # (III)
Fall. 4 credits. Not offered 2001–2002. N. Russell.
For description, see ANTHR 466.]

[ARKEO 469 Gender and Age in Archaeology (also ARKEO 669 and ANTHR 469/669) # (III)
Spring. 4 credits. Not offered 2001–2002. N. Russell.
For description, see ANTHR 469.]

[ARKEO 493 Seminar in Archaeology (also ANTHR 493)
Fall. 4 credits. Not offered 2001–2002.]

[ARKEO 494 Seminar in Archaeology: The Archaeology of Human Origins (also ANTHR 494)
Fall. 4 credits. Not offered 2001–2002. T. P. Volman.
For description, see ANTHR 494.]

[ARKEO 609 Approaches to Archaeology (also ARKEO 409 and ANTHR 409/609)
Fall. 4 credits. Basic. Prerequisite: permission of instructor. Not offered 2001–2002. N. Russell.
For description, see ANTHR 409.]

[ARKEO 659 Archaeology of the Household (also ARKEO 459 and ANTHR 459/659)
Fall. 4 credits. Not offered 2001–2002. J. Henderson and N. Russell.
For description, see ANTHR 459.]

[ARKEO 666 Humans and Animals (also ARKEO 466 and ANTHR 466/666)
Fall. 4 credits. Not offered 2001–2002. N. Russell.
For description, see ANTHR 466.]

ARKEO 667 Contemporary Archaeological Theory (also ANTHR 667)
Spring. 4 credits. Prerequisite: undergraduates by permission of instructor. Limited to 14 students. N. Russell.
For description, see ANTHR 667.

[ARKEO 669 Gender and Age in Archaeology (also ARKEO 469 and ANTHR 469/669)
Spring. 4 credits. Not offered 2001–2002. N. Russell.
For description, see ANTHR 469.]

[ANTHR 456 Mesoamerican Religion, Science, and History
Fall. 4 credits. Not offered 2001–2002.]

[LA 260 Preindustrial Cities and Towns of North America (also CRP 260)
Fall. 3 credits. Not offered 2001–2002. S. Baugher.
For description, see LA 260.]

C. Classical, Near Eastern, and Medieval Archaeology

[ARKEO 221 Minoan-Mycenaean Art and Archaeology (also CLASS 221 and ART H 221) # (IV)
3 credits. Basic. Not offered 2001–2002. J. Coleman.
For description, see CLASS 221.]

[ARKEO 233 Archaeology in Action II (also ART H 225 and CLASS 233) # (IV)
Spring. 3 credits. Prerequisite: permission of instructor. Not offered 2001–2002. P. I. Kuniholm.
For description, see ART H 225.]

[ARKEO 240 Old World Prehistory (also ANTHR 240) # (III)
Fall. 3 credits. Not offered 2001–2002. N. Russell.
For description, see ANTHR 240.]

ARKEO 263 Introduction to Biblical History and Archaeology (also NES 263, JWST 263, and RELST 264) @ # (III)
Spring. 3 credits. J. Zorn.
For description, see NES 263.

ARKEO 268 Ancient Egyptian Civilization (also NES 268 and JWST 268) @ # (III or IV)
Spring. 3 credits. G. Kadish.
For description, see NES 268.

[ARKEO 275 Ancient Seafaring (also JWST 261 and NES 261) @ # (III)
3 credits. Not offered 2001–2002. D. I. Owen.
For description, see NES 261.]

[ARKEO 321 Mycenae and Homer (also CLASS 321 and ART H 321) # (IV)
Fall. 4 credits. Prerequisite: at least 1 previous course in Archaeology, Classics, or History of Art. Not offered 2001–2002. J. Coleman.
Study of the relationship between the Mycenaean period of Greece (known primarily from archaeology) and the Homeric *Iliad* and *Odyssey*. Topics include Mycenaean architecture, burial customs, kinship, and military activities; the reasons for the collapse of the Bronze Age palatial economies; the archaeological evidence for society in the "Dark Ages" that followed; the writing systems of Mycenaean Greece (Linear B) and the Iron Age (the Semitic/Greek alphabet); and the nature of the Homeric poems and their value as historical sources.]

ARKEO 360–61 Origins of Mesopotamian Civilization (also NES 360–361) @ # (III or IV)
360, fall; 361, spring. 4 credits. D. Owen.
For description, see NES 360–61.

[ARKEO 366 The History and Archaeology of the Ancient Near East (also JWST 366 and NES 366) @ # (III or IV)
Fall. 4 credits. Not offered 2001–2002. D. I. Owen.
For description, see NES 366.]

[ARKEO 380 Introduction to the Arts of China (also ART H 380) @ # (IV)
Fall. 4 credits. Not offered 2001–2002. A. Pan.
For description, see ART H 380.]

[ARKEO 417 Early Medieval Archaeology and Literature (also ARKEO 617, ENGL 417 and 617) # (IV)
Fall. 4 credits. Prerequisite: permission of instructor. Enrollment limited to 15 students. This course may be used as one of the three pre-1800 courses required of English majors. Not offered 2001–2002. R. T. Farrell.
For description, see ENGL 417.]

[ARKEO 425 Seminar on the Bronze Age Architecture of Asia Minor (also ART H 425 and CLASS 430) # (IV)
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. P. I. Kuniholm.]

[ARKEO 432 Sardis and the Cities of Asia Minor (ART H 424 and CLASS 432) # (IV)
4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. A. Ramage.]

ARKEO 434 The Rise of Classical Greece (also ART H 434 and CLASS 434) # (IV)
4 credits. Recommended: CLASS 220 or 221 or ART H 220 or 221, or permission of instructor. P. I. Kuniholm.
For description, see ART H 434.

ARKEO 435 Seminar on Roman Art and Archaeology (also CLASS 435 and ART H 427) # (IV)
Spring. 4 credits. Prerequisite: permission of instructor. A. Ramage.
For description, see ART H 427.

[ARKEO 520 Seminar in Classical Archaeology (also ART H 520 and CLASS 630)
Fall. 4 credits. Not offered 2001–2002. J. E. Coleman.
For description, see CLASS 630.]

[ARKEO 617 Early Medieval Archaeology and Literature (also ARKEO 417, ENGL 417 and 617)
Fall. 4 credits. Not offered 2001–2002. R. T. Farrell.
For description, see ENGL 417.]

[ARKEO 629 The Prehistoric Aegean (also CLASS 629)
4 credits. For graduate students and advanced undergraduates with permission of instructor. Not offered 2001–2002. J. E. Coleman.
For description, see CLASS 629.]

CLASS 220 Introduction to Art History: The Classical World (also ART H 220)
Fall. 4 credits. J. Rife.
For description, see CLASS 220.

CLASS 319 Art in the Daily Life of Greece and Rome (also ART H 319)
Spring. 4 credits. A. Ramage.
For description, see ART H 319.

[CLASS 322 Greeks and Barbarians (also ART H 328)
Fall. 4 credits. Prerequisite: Classics 220 or 221, or permission of instructor. Not offered 2001–2002. J. Coleman.
For description, see CLASS 322.]

[CLASS 329 Greek Sculpture (also ART H 329)
4 credits. Not offered 2001–2002. J. E. Coleman.
For description, see CLASS 329.]

CLASS 333 Greek and Roman Mystery Cults and Early Christianity (also RELST 333)
Fall. 4 credits. A previous course in Classics (civilization or language) or RELST 101 is recommended. K. Clinton.
For description, see CLASS 333.

[ART H 322 Arts of the Roman Empire (also CLASS 350)
Fall. 4 credits. Not offered 2001–2002. A. Ramage.
For description, see ART H 322.]

[ART H 325 Greek Vase Painting (also CLASS 325)
Fall 4 credits. Not offered 2001–2002. A. Ramage.
For description, see ART H 325.]

[ART H 327 Greek and Roman Coins (also CLASS 327)
4 credits. Not offered 2001–2002. A. Ramage.
For description, see ART H 327.]

LA 292 Creating a Second Nature
Spring. 3 credits. Prerequisites: none. ANTHR 100, ARKEO 100, or CLASS/ART H 220 recommended. Offered alternate years; next offered spring 2002. K. Gleason.
For description, see LA 292.

LA 545 The Parks and Fora of Imperial Rome
Spring. 3 credits. Prerequisites: advanced standing in a design field, classics or history of art, or by permission of the instructor. K. Gleason.
For description, see LA 545.

D. Methodology and Technology

[ARKEO 256 Practical Archaeology (also CLASS 256) (IV)
Spring. 3 credits. Not offered 2001–2002. J. Coleman.
For description, see CLASS 256.]

ARKEO 262 Laboratory in Landscape Archaeology (also LA 262)
Fall. 3 credits. S. Baugher.
For description, see LA 262.

ARKEO 285 Art, Archaeology, and Analysis (also ART 372, ENGR 185, EAS 200, MS&E 285, ART H 200, NS&E 285, and PHYS 200) (I or IV)
Spring. 3 credits. Does not meet liberal studies distribution requirements. Staff.
For description, see EAS 200.

ARKEO 309 Dendrochronology of the Aegean (also ART H 309 and CLASS 309) # (III or IV)
Fall and spring. 4 credits. Limited to 10 students. Letter only. Prerequisite: permission of instructor. P. I. Kuniholm.
For description, see ART H 309.

[ARKEO 370 Environmental Archaeology (also ARKEO 670 and ANTHR 370 and 670) (III)
Spring. 4 credits. Prerequisite: 2 previous courses in archaeology or permission of instructor. Not offered 2001–2002. T. P. Volman.
For description, see ANTHR 370.]

[ARKEO 405 Archaeological Research Design (also ARKEO 605 and ANTHRO 405/605) (III)
Spring. 4 credits. Basic. Prerequisite: permission of instructor. Not offered 2001–2002. J. S. Henderson, T. P. Volman.
For description, see ANTHR 405.]

[ARKEO 423 Ceramics (also ART H 423 and CLASS 423) # (IV)
Fall. 4 credits. Prerequisite: permission of instructor. Not offered 2001–2002. A. Ramage.
For description, see ART H 423.]

[ARKEO 458 Archaeological Analysis (also ARKEO 658 and ANTHR 458/658) (III)
Spring. 4 credits. Prerequisite: 1 course in archaeology or permission of instructor. Enrollment limited to 15 students. Not offered 2001–2002. J. S. Henderson.
For description, see ANTHR 458.]

[ARKEO 463 Zooarchaeological Method (also ANTHR 463) (III)
Fall. 5 credits. Not offered 2001–2002. N. Russell.
For description, see ANTHR 463.]

[ARKEO 464 Zooarchaeological Interpretation (also ANTHR 464) (III)
Spring. 4 credits. Not offered spring 2001. N. Russell.
For description, see ANTHR 464.]

[ARKEO 467 Origins of Agriculture (also ANTHR 467) # (III)
Spring. 4 credits. Not offered 2001–2002.]

ARKEO 601 Graduate Colloquium in Archaeology
4 credits. Open to graduate students and advanced undergraduates by permission of instructor. Staff.
Faculty members of the Program in Archaeology and invited speakers present summaries of the different aspects of archaeological analysis. Topics may include: lithics, ceramic typology, petrographic and neutron activation analysis, dendrochronology and other chronological techniques, settlement patterns, inscriptions, human and animal bones.

[ARKEO 605 Archaeological Research Design (also ARKEO 405 and ANTHR 405/605)
Spring. 4 credits. Basic. Prerequisite: permission of instructor. Not offered 2001–2002. J. S. Henderson, T. P. Volman.
For description, see ANTHR 405.]

[ARKEO 670 Environmental Archaeology (also ARKEO 370 and ANTHR 370 and 670)
Spring. 4 credits. Prerequisite: 2 previous courses in archaeology or permission of instructor. Not offered 2001–2002. T. P. Volman.
For description, see ANTHR 370.]

[ANTHR 474 Laboratory and Field Methods in Human Biology (also BIOES 474)
5 credits. Prerequisite: 1 year of introductory biology, Anthropology 101, or permission of instructor. Next offered 2002–2003. K. A. R. Kennedy.]

BIOES 371 Human Paleontology (also ANTHR 371)
Fall. 4 credits. Prerequisite: one year of introductory biology, ANTHR 101, or permission of instructor. K. A. R. Kennedy.
For description, see BIOES 371.

[BIO ES 671 Paleoanthropology of South Asia (also ANTHR 671 and ASIAN 620)
Fall. 3 credits. Not offered 2001–2002. K. A. R. Kennedy.
For description, see BIO ES 671.]

[BIO ES 673 Human Evolution: Concepts, History, and Theory (also ANTHR 673)
Fall. 3 credits. Prerequisite: one year of introductory biology or ANTHR 101 or permission of instructor. Not offered 2001–2002. K. A. R. Kennedy.
For description, see BIOES 673.]

LA 261 Urban Archaeology (also CRP 261)
Fall. 3 credits. S. Baugher.
For description, see LA 261.

LA 569 Archaeology in Preservation Planning and Design (also CRP 569)
Spring. 3 credits. Offered alternate years. S. Baugher.
For description, see LA 569.

Asian American Studies Program

The Asian American Studies Program is a university-wide academic program housed administratively within the College of Arts and Sciences. Its aim is to promote teaching, research, and educational activities related to Asian Americans and to serve as a resource to the campus and regional communities. The program's undergraduate courses, offered within the program and cross-listed with departments in various colleges, meet distribution requirements and count toward a concentration in Asian American Studies. The program does not offer a graduate course of study, but students can undertake graduate work in Asian American Studies within selected disciplines of the university.

Undergraduate Concentration

The program's undergraduate concentration affords students an opportunity to develop a multidisciplinary approach to the study of Asians in America. The course of study stresses developments within the United States, but also underscores the transnational and comparative contexts of Asian America and the field's connections with African American, American Indian, Latino, and Women's Studies. Students must work with a faculty adviser from among the program's affiliated faculty and must complete at least 15 units of credits as follows: (a) AAS 110 and two additional courses in Asian American Studies; (b) one course in Africana, American Indian, Latino Studies, or Women's Studies*; and (c) one course in East Asian, South Asian, or Southeast Asian Studies.* (*These courses must be approved by the student's faculty adviser, and they should address issues of race, gender, or the histories and cultures of Asian peoples.) Students must file an application for the concentration with the Asian American Studies Program.

Resource Center

The program's Asian American Studies Resource Center provides meeting space for the more than 35 undergraduate student organizations of the Cornell Asian Pacific Student Union and the graduate student Asian Pacific American Graduate Association. It also holds a modest print collection of books, periodicals, and newspapers; a current news clip file; a comprehensive data base of publications on Asian Americans since 1977; and a sizable collection of videotapes on the Asian American experience.

Research

The program encourages faculty and student research on Asian Americans by sponsoring guest lectures, conferences, film festivals, readings, and exhibits. It also funds research projects and student travel to conferences and research sites. The Asian American Studies Workshop is the program's principal research initiative, engaging Cornell's faculty and students with invited faculty from other universities in a year-long intensive study of selected themes.

Affiliated Faculty

T. Chaloemtiarana (Southeast Asia Program), B. de Bary (Asian studies), S. Han (sociology), V. P. Kayastha (Kroch Library), J. V. Koschmann (history), L. C. Lee (human development), V. Munasinghe (anthropology), V. Nee (sociology), R. E. Ripple (education), N. Sakai (Asian studies), S. Samuels (English), A. M. Smith (government), K. W. Taylor (Asian studies), Wai-Kwong Wong (Gannett Health Center), S. Wong, director (English), D. Yeh (vice president student/academic services)

Courses

AAS 110 Introduction to Asian American Studies (III or IV)
Spring. 3 credits. This course can be used to satisfy either a social science or humanities distribution requirement. S. Davé.
An interdisciplinary, cross-cultural introduction to Asian American Studies focusing on contemporary issues. Major themes include: identity and stereotypes, gender, family, community, education, migration and labor, and anti-Asianism. Coverage is given to both Hawaii and the U.S. mainland, and to Asian Indians, Chinese, Filipinos, Hawaiians, Japanese, Koreans, and Southeast Asians.

[AAS 213 Asian American History (III)
Spring or fall. 4 credits. Not offered 2001–2002.
For description, see HIST 213.]

AAS 262 Asian American Literature (IV)
Spring. 4 credits. S. Wong.
For description, see ENGL 262.

AAS 266 Asian American Women and Literature (also AM ST 266, ENGL 266 and WOMNS 266) (IV)
Fall. 4 credits. S. Davé.
This course explores the intersection of ethnicity, race, class, gender, and sexuality in the lives and literature of Asian American women. We discuss and analyze the historical, and contemporary social, political, and economic forces that have shaped women's lives and how they are reflected in literature. Our goal in the course is to explore and discover the diversity of voices in Asian American women's experiences and the similarities and commonalities of their social histories.

AAS 303 Asians in the Americas: A Comparative Perspective (also ANTHR 303) (III)
Fall. 4 credits. A. Subramanian.
The common perception of ethnicity is that this is a "natural" and an inevitable consequence of cultural difference. "Asians" overseas, in particular, have won repute as a people who cling tenaciously to their culture and refuse to assimilate into their host societies and cultures. But, who are the "Asians"? On what basis can we label Asians an ethnic group? Although there is a significant Asian presence in the Caribbean, the category "Asian" itself does not exist in the Caribbean. What does this say about the nature of categories that label and demarcate groups of people on the basis of alleged cultural and phenotypical characteristics? This course examines the dynamics behind group identity, namely ethnicity, by comparing and contrasting the multicultural experience of Asian populations in the Caribbean and the United States. Ethnographic case studies focus on the East Indian and Chinese experiences in the Caribbean and the Chinese, Korean, Japanese, Filipino, and Indian experiences in the United States.

[AAS 412 Undergraduate Seminar in Asian American History (also HIST 412) (III)
Spring. 4 credits. Not offered 2001–2002.
For description, see HIST 412. A reading and research seminar that covers various topics in Asian American history.]

[AAS 438 Immigration and Ethnic Identity (III)
Spring. 4 credits. Not offered 2001–2002.
For description, see SOC 438.]

AAS 461 Asian Americans and Popular Culture (also AM ST 461, ENGL 461, and THETR 461) (IV)
Fall. 4 credits. S. Davé.
This course examines how Asian Americans are represented and represent themselves in American forms of popular culture such as literature, television, film, and print media. We explore the cultural contexts of the term "Asian American" that define its visibility and marketability in contemporary times. Some questions we address include: Is there an Asian American aesthetic, and, if so, how is it characterized? What are the consequences of the consumption of ethnic products by a mainstream audience? What are the ramifications of mass marketing for Asian American writers, producers, and artists?

[AAS 478 Self and Nation in Asian-American Literature (also ENGL 478) (IV)
4 credits. Not offered 2001–2002.
A study of the ways in which Asian American writers have constructed discourses of self and nation. Topics include nationalism, feminism, identity politics, and theories of minority discourse. In our reading of selected works of prose, poetry, and drama by Chinese American, Filipino American, Japanese American, and Korean American writers, we ask questions about the relation of these works to the moment of their production and reception, and the manner in which these textual representations engage with shifting cultural and political struggles. Writers under discussion may include: Carlos Bulosan, Theresa Hak Kyung Cha, Frank Chin, Jessica Hagedorn, and David Henry Hwang, Maxine Hong Kingston, Joy Kogawa, and David Mura.]

AAS 485 South Asian Formations and Asian American Studies (also ENGL 485) (IV)
Spring. 4 credits. S. Davé.
This course examines and discusses the emergence and recent explosion of South Asian American literature and research in

relation to the field of Asian American Studies. We read some of the recent literature published such as Jhumpa Lahiri's Pulitzer prizewinning *Interpreter of Maladies* as well as examining the historical and political nature of the community of South Asians in the U.S. Course topics include mass media, literature, gender and sexuality, history, theoretical essays, and a session attendance at the South Asian Studies Conference in Madison in October. We use both a comparative approach to other ethnic communities within the Asian Pacific American community and we explore the complexity of issues within the South Asian American community. Course covers a variety of works by authors such as Chandra Mohanty, Bharati Mukherjee, Yen Espiritu, Biju Matthew, Vijay Prasad, Sonia Shah, and Urvashi Vaid.

[AAS 492 Twentieth-Century Women Writers of Color

Spring. 4 credits. Not offered 2001–2002. This course explores a range of writing—novels, stories, poems, essays—by American women writers of color in the twentieth century. We look at how these writings articulate concerns with language, home, mobility, and memory, and at how the work is informed by the specificities of gender, race, region, and class. Readings may include works by Joy Harjo, Leslie Marmon Silko, Sandra Cisneros, Gloria Anzaldua, Theresa Hak Kyung Cha, Sigrid Nunez, Jamaica Kincaid, Maxine Hong Kingston, and Gwendolyn Brooks.]

AAS 495 Independent Study

Fall or spring. 1–4 credits.
Topic and credit hours to be mutually arranged between faculty and student. Independent Study Forms must be approved by Asian American Studies Program Office.

Biology & Society Major

J. V. Reppy, director of undergraduate studies, colleges of Arts and Sciences and Agriculture and Life Sciences; N. Breen, advising coordinator, College of Human Ecology; D. Gurak, advising coordinator, College of Agriculture and Life Sciences; E. Adkins-Regan, D. Bates, B. Bedford, R. Boyd, T. Brenna, R. Calvo, R. Canfield, S. Ceci, B. Chabot, C. C. Chu, P. Dear, M. Dennis, R. Depue, C. Eberhard, G. W. Evans, G. W. Feigenson, J. Ford, J. Fortune, C. Geisler, C. Greene, H. Greene, J. Haas, A. Hedge, S. Hilgartner, R. Howarth, H. C. Howland, K. A. R. Kennedy, R. Kline, B. Knuth, A. Lemley, D. Levitsky, B. Lewenstein, B. A. Lewis, M. Lynch, H. Mialet, A. Netravali, N. Noy, S. K. Obendorf, L. Palmer, A. Parrot, M. Pfeffer, T. Pinch, A. G. Power, W. Provine, S. Robertson, E. Rodriquez, M. Rossiter, P. Schwartz, J. Shanahan, M. Small, J. M. Stycos, V. Utermohlen, E. Wethington. Emeritus: U. Bronfenbrenner, J. Fessenden MacDonald, J. Mueller, D. Pimentel

The Biology & Society major is suited for students who wish to combine training in biology with exposure to perspectives from the social sciences and humanities on the social, political, and ethical aspects of modern biology. In addition to providing a foundation in biology, Biology & Society students obtain background in the social dimensions of modern biology and in the biological dimensions of contemporary social issues.

The Biology & Society major, which involves faculty from throughout the university, is offered by the Department of Science & Technology Studies. Students in the College of Arts and Sciences, the College of Human Ecology, and the College of Agriculture and Life Sciences are eligible for the major. The major is coordinated for students in all colleges through the Biology & Society Office. Students can get information, specific course requirements, and application procedures for the major from the Biology & Society office in 275 Clark Hall, 255–6047.

Because the major is multidisciplinary, students must attain a basic understanding of the several disciplines it comprises. The curriculum includes courses in ethics; mathematics; statistics; history, philosophy, and social studies of science and biology; and basic biology (e.g., genetics and development; biochemistry and molecular-cell biology; ecology; evolutionary biology), as well as integrative courses offered through Biology & Society. In addition, majors are required to take a core course and must develop a theme: an intellectually coherent grouping of courses representative of their special interest in biology and society. Recommended themes in the Biology & Society major include biology, behavior, and society; biology and human population; biology and public policy; environment and society; food agriculture and society; and health and society. Students may also develop their own individually tailored themes (which in recent years have included topics such as biotechnology and society and agriculture, environment, and society). In consultation with their faculty adviser, students select courses that meet the foundation and core course requirements so as to build a coherent theme. Sample curricula for the recommended themes and for several student-developed themes are available in the Biology & Society Office.

There are student advisers and faculty available (according to posted office hours or by appointment) in the Biology & Society Offices, 275 Clark Hall or 278 Clark Hall, to answer questions and to provide assistance.

Admission to the Major

All students should have completed a year of college-level biology before submitting an application during their sophomore year. Juniors are considered on a case-by-case basis. Upper-division applicants should realize the difficulties of completing the major requirements in fewer than two years. Freshmen admitted to the Colleges of Agriculture and Life Sciences and Human Ecology as Biology & Society majors are considered to have been admitted to the major on a provisional basis, contingent on successful completion of the course sequence in introductory biology. The application includes (1) a one-page statement explaining the student's intellectual interests in the Biology & Society major and why the major is consistent with the student's academic goals and interests; (2) the theme the student wishes to pursue in the major; (3) a tentative plan of courses fulfilling Biology & Society requirements, including courses taken and those the student plans to take; and (4) a transcript of work completed at Cornell University and elsewhere, if applicable, current as of the date of application.

Acceptance into the major requires completion of the course sequence in introductory biology. Sophomores in the process of completing this prerequisite may be admitted to the major on a *provisional* basis. It is the student's responsibility to assure that final acceptance is granted upon satisfactory completion of the introductory biology sequence. Although only introductory biological science is a prerequisite for acceptance, students will find it useful to have completed some of the other requirements (listed below) by the end of their sophomore year, preferably by the end of the first semester. Students who are considering the major may also find it beneficial to take "S&TS 201, What is Science?" in their freshman or sophomore year. Human Ecology students should also consult the current Human Ecology Guide and meet with the college advising coordinator, Nancy Breen, 287A Martha Van Rensselaer Hall, 255–1928.

Major Requirements

No single course may satisfy more than one major requirement.

1) **Basic courses**

   A. BIO S 101–104 or 105–106 or 107–108 (prerequisite for admission to Biology and Society).

   B. College calculus (one course):* MATH 106, 111, 112 or any higher level calculus.

   Recommended but not required: General chemistry (one year sequence) (prerequisite to biochemistry and other chemistry courses): CHEM 103–104, 207–208, or 215–216.

2) **Foundation Courses** (should be completed by end of junior year).

   These courses must be above the 100-level, at least three credit hours, and taken for a letter grade.

   A. Ethics: one course; B&SOC 205 (also S&TS 205) or B&SOC 206 (also S&TS 206).**

   B. Social sciences/humanities foundation: two courses; one from any two of the following subject areas: History of Science; Philosophy of Science; Sociology of Science; Politics of Science; and Science Communication.**

   C. Biology foundation (breadth requirement): three courses; one each from three of the following subject areas: Ecology (BIO ES 261); Evolutionary Biology (BIO ES 278); Biochemistry, Molecular and Cell Biology (BIO BM or NS 320, 330 or 331 or 333); Microbiology (BIO MI 290); Genetics and Development (BIO GD 281 or 282 or Plant Breeding 225); Neurobiology and Behavior (BIO NB 221 or 222); Botany (BIO PL 241); and Anatomy and Physiology (BIO AP 311 or NS 341 but **NOT** BIO AP 212).

   D. Biology foundation (Depth requirement): one biology course for which one of the above (2C) is a prerequisite.

   E. Statistics: one course selected from MATH 171, ILR 210, BTRY 215, AG EC 310, EDUC 353, SOC 301, PSYCH 350, ECON 319, OR&IE 370, BTRY 601, CRP 320, PAM 210.

3) **Core Course**: (one course).** Should be completed by end of junior year.

   B&SOC 301 Biology and Society: The Social Construction of Life (also S&TS 401); or PHIL 286: Science and Human Nature (also S&TS 286).

4) **Theme** (five courses that correspond to the theme selected by the student). These courses must be above the 100-level, at least three credit hours, and taken for a letter grade. Choose these courses as follows:

   A. Natural Science Issues/Biology Elective (two courses). Select from the list of B&SOC approved Natural Science Issues courses or choose course(s) with introductory biology as a prerequisite from: ALS, AN SC, BIOSCI, ENTOM, FOOD, HD, NS, NTRES, PL BR, PL PA, PSYCH, VTMED.

   B. Humanities/social sciences electives** (two courses). Courses from the list of Senior Seminars may be used as theme electives if not used to meet another requirement.

   C. Senior Seminar** (One course taken senior year). Courses change yearly.

* Students may petition to take a second statistics course (an advanced course, in sequence with the statistics course taken in the foundation) in place of the calculus requirement.

** Among the courses taken to meet the social sciences and humanities requirements (2.A, 2.B, 3, and 4.C), a minimum of two social science courses and two humanities courses must be chosen. History of science and philosophy of science courses may be counted toward the humanities requirement for the major.

Independent Study

Projects under the direction of a Biology & Society faculty member are encouraged as part of the program of study in the student's theme area. Applications for research projects are accepted by individual faculty members. Students may enroll for 1–4 credits in B&SOC 375 (Independent Study) with written permission of the faculty supervisor and may elect either the letter grade or the S-U option. Applications and information on faculty research, scholarly activities, and undergraduate opportunities are available in the Biology & Society Office, 275 Clark Hall. Independent study credits may not be used in completion of the major requirements.

The Honors Program

The honors program is designed to provide independent research opportunities for academically talented undergraduate students whose major is Biology & Society (B&SOC). Students who enroll in the honors program are expected, with faculty guidance, to do independent study and research dealing with issues in biology and society. Students participating in the program should find the experience intellectually stimulating and rewarding whether or not they intend to pursue a research career.

Biology & Society majors are considered for entry into the honors program at the end of the second semester of the junior year. Application forms for the honors program are available in the Biology & Society Office, 275 Clark Hall. The honors program is available to Biology & Society majors from the College of Arts and Sciences. Biology & Society majors in the Colleges of Human Ecology and Agriculture and Life Sciences must be selected by an honors committee within their college. To qualify for the Biology & Society honors program, students must have an overall Cornell cumulative grade-point average of at least 3.3, have formulated a research topic, and have found a project supervisor (with a Cornell appointment) and a Biology & Society faculty member willing to serve as their advisers. Applications will be reviewed by a committee headed by the director of undergraduate studies, who will notify students directly of the outcome. Students will be permitted to register for the honors program only by permission of the department. Students must enroll for two semesters and may take three to five credits per semester up to a maximum of eight credits in B&SOC 498 and 499, Honors Project I and II. More information on the honors program is available in the Biology & Society Office, 275 Clark Hall (255–6047).

People to contact for Biology & Society Honors Information:

In Arts & Sciences: Judith Reppy, Director of Undergraduate Studies, jvr2@cornell.edu

In Agriculture & Life Sciences: David Pimentel, Faculty Representative to CALS Honors Committee, dp18@cornell.edu

In Human Ecology: Nancy Breen, Advising Coordinator, CHE, neb5@cornell.edu

Further Information

Professor Judith Reppy, Director of Undergraduate Studies, jvr2@cornell.edu

Professor Douglas Gurak, Advising Coordinator, College of Agriculture & Life Sciences, dtg2@cornell.edu

Dr. Nancy Breen, Advising Coordinator, College of Human Ecology, neb5@cornell.edu

Ms. Marta Weiner, Administrative Assistant, Records and Admissions, msw8@cornell.edu

Ms. Florence Whitford, Administrative Assistant, Courses, fnw1@cornell.edu

Biology & Society Advising Office, 275 Clark Hall; (607) 255–6047 or 6042.

Website: http://www.sts.cornell.edu

I. First-Year Writing Seminars

Consult the John S. Knight Institute brochure for times, instructors, and descriptions.

II. Foundation Courses

*A. **Ethics*** (one course)

B&SOC 205 Ethical Issues in Health and Medicine (also S&TS 205) (IV)
Fall. 4 credits. Limited to 150 students. Open to sophomores, juniors, and seniors. Prerequisites: none. E. Toon.
In today's rapidly changing world of health and medicine, complex ethical issues arise in many contexts—from the private, interpersonal interactions between doctor and patient to the broad, mass-mediated controversies that make medicine into headline news. This course examines ethical problems and policy issues that arise in contemporary medicine, health care, and biomedical research. Tools for ethical analysis are applied to a variety of cases and fundamental questions in bioethics. Perspectives from social science, history, and law also inform the course. We explore ethical questions that arise in a number of substantive contexts, including the doctor-patient relationship, medical decision making near the end of life, human experimentation, genetics and reproductive technology, public health, and the allocation of scarce resources.

B&SOC 206 Ethics and the Environment (also S&TS 206 and PHIL 246) (IV)
Spring. 4 credits. Limited to 60 students. Open to all undergraduates; permission of instructor required for freshmen. N. Sethi.
The aim of this course is to acquaint students with moral issues that arise in the context of the environment and environmental policy. Our concerns about the environment bring to our attention the importance of economic, epistemological, legal, political and social issues in assessing our moral obligations to other humans and the natural world. Our attempt is then to explore how different factors come into play in defining our responsibilities to the environment and to examine the grounds for our environmental policy decisions. A background in basic ecology *or* environmental issues *or* ethics is helpful.

*B. **Social Sciences/Humanities Foundation*** (two courses, one from any two areas)

1. History of Science

[S&TS 233 Agriculture, History, and Society: From Squanto to Biotechnology
Fall. 3 credits. Not offered 2001–2002. M. Rossiter.
For description, see S&TS 233.]

S&TS 282 Science in Western Civilization (also HIST 282)
Spring. 4 credits. P. R. Dear.
For description, see HIST 282.

[S&TS 283 The Sciences in the Twentieth Century (also HIST 280)
Spring. 4 credits. Not offered 2001–2002. M. Dennis.
For description, see S&TS 283.]

S&TS 287 Evolution (also BIOEE 207 and HIST 287)
Fall or summer. 3 credits. May not be taken for credit after BIOEE 278. W. B. Provine.
For description, see BIOEE 207.

S&TS 355 Computers: From Babbage to Gates
Fall. 4 credits. M. Dennis.
For description, see S&TS 355.

[S&TS 390 Science in the American Polity: 1800–1960 (also GOVT 308, AM ST 388)
Fall. 4 credits. Not offered 2001–2002. M. Dennis.
For description, see S&TS 390.]

[S&TS 433 Comparative History of Science
Spring. 4 credits. Not offered 2001–2002. M. Rossiter.
For description, see S&TS 433.]

S&TS 444 Historical Issues of Gender and Science (also WOMNS 444)
Spring. 4 credits. M. Rossiter.
For description, see S&TS 444.

2. Philosophy of Science

S&TS 201 What is Science? An Introduction to the Social Studies of Science and Technology (also SOC 210)
Spring. 3 credits. T. Pinch.
For description, see S&TS 201.

S&TS 286 Science and Human Nature (also PHIL 286)
Spring. 4 credits. May be used to meet the philosophy of science requirement *if not* used to meet the core course requirement. R. Boyd.
For description, see PHIL 286.

S&TS 381 Philosophy of Science: Knowledge and Objectivity (also PHIL 381)
Fall. 4 credits. R. Boyd.
For description, see PHIL 381.

3. Sociology of Science

B&SOC 301 Biology and Society: The Social Construction of Life (also S&TS 401) (III)
Fall. 4 credits. May be used to meet the sociology of science requirement if not used to meet the core course requirement. E. Toon.
See Core Courses for description.

B&SOC 342 Sociology of Science (also S&TS 442, SOC 442, and CRP 442) (III)
Fall. 4 credits. T. Pinch.
For description, see S&TS 442.

R SOC 208 Technology and Society
Fall. 3 credits. C. Geisler.
For description, see R SOC 208.

S&TS 201 What Is Science? An Introduction to the Social Studies of Science and Technology (also SOC 210)
Spring. 3 credits. T. Pinch.
For description, see S&TS 201.

S&TS 311 The Sociology of Medicine
Spring. 4 credits. E. Toon.
For description, see S&TS 311.

S&TS 411 Knowledge, Technology, and Property
Spring. 4 credits. S. Hilgartner.
For description, see S&TS 411.

[SOC 434 The Sociology of Reproduction (also WOMNS 435)
Spring. 4 credits. Not offered 2001–2002. Staff.
For description, see SOC 434.]

4. Politics of Science

B&SOC 406 Biotechnology and Law (also S&TS 406) (III)
Spring. 4 credits. L. Palmer.
For description, see S&TS 406.

[B&SOC 407 Law, Science, and Public Values (also GOVT 407 and S&TS 407) (III)
Spring. 4 credits. Not offered 2001–2002. M. Lynch.
For description, see S&TS 407.]

CRP 380 Environmental Politics
Fall. 4 credits. R. Booth.
For description, see CRP 380.

S&TS 324 Environment & Society (also R SOC 324 and SOC 324)
Spring. 3 credits. L. Glenna.
For description, see R SOC 324.

S&TS 391 Science in the American Polity: 1960–Now (also GOVT 309, AM ST 389)
Fall. 4 credits. M. Dennis.
For description, see S&TS 391.

[S&TS 427 Politics of Environmental Protection in America (also GOVT 427)
Fall. 4 credits. Not offered 2001–2002.
For description, see S&TS 427.]

5. Science Communication

COMM 260 Scientific Writing for Public Information
Fall or spring. 3 credits. Limited to 25 non-freshman or graduate students per section. L. Cowdery.
For description and prerequisites, see COMM 260.

[COMM 421 Communication and the Environment
Spring. 3 credits. May be used in Foundation only if **not** taken as senior seminar. Not offered 2001–2002. J. Shanahan.
For description, see COMM 421.]

S&TS 285 Communication in the Life Sciences (also COMM 285)
Spring. 3 credits. B. Lewenstein.
For description, see COMM 285.

S&TS 352 Science Writing for the Mass Media (also COMM 352)
Fall. 3 credits. B. Lewenstein.
For description and prerequisites, see COMM 352.

[S&TS 466 Communication of Science and Technology (also COMM 466)
Fall. 3 credits. Limited to 15 students. May be used in Foundation only if **not** taken as senior seminar. Not offered 2001–2002. B. Lewenstein.
For description and prerequisites, see COMM 466.]

*C. **Biology foundation*** (breadth requirement): Three courses: one from three of the following subject areas:

1. Biochemistry, Molecular and Cell Biology

BIOBM 330 Principles of Biochemistry, Individual Instruction
Fall or spring. 4 credits. Blankenship, Hinkle, staff.
For description and prerequisites, see BIOBM 330.

BIOBM 331 Principles of Biochemistry: Proteins and Metabolism
Fall. 3 credits. May not be taken for credit after BIOBM 330 or 333. G. Feigenson.
For description and prerequisites, see BIOBM 331.

BIOBM 333 Principles of Biochemistry, Lectures
Summer. 4 credits. H. T. Nivison.
For description and prerequisites, see BIOBM 333.

NS 262 The Cell and the External World
Spring. 3 credits. N. Noy.
For description and prerequisites, see NS 262.

NS 320 Introduction to Human Biochemistry
Fall. 4 credits. W. Arion and P. Stover.
For description and prerequisites, see NS 320.

2. Ecology

BIOEE 261 Ecology and the Environment
Fall or summer. 4 credits. Not open to freshmen. N. G. Hairston.
For description and prerequisites, see BIOES 261.

3. Genetics and Development

BIOGD 281 Genetics
Fall, spring, or summer. 5 credits. Not open to freshmen fall semester. Limited to 200 students. P. Bruns.
For description and prerequisites, see BIOGD 281.

BIOGD 282 Human Genetics
Spring. 2 or 3 credits (2 cr. if taken after BIOGD 281). Limited to 25 per discussion group. M. Goldberg.
For description and prerequisites, see BIOGD 282.

4. Evolutionary Biology

BIOEE 278 Evolutionary Biology
Fall or spring. 3 or 4 credits. M. Geber.
For description, see BIOES 278.

5. Microbiology

BIOMI 290 General Microbiology Lectures
Fall, spring, or summer. 2 or 3 credits. S. Merkel, Winans, Helmann.
For description and prerequisites, see BIOMI 290.

6. Neurobiology and Behavior

BIONB 221 Neurobiology and Behavior I: Introduction to Behavior
Fall. 3, 4, or 5 credits. P. W. Sherman.
For description and prerequisites, see BIONB 221.

BIONB 222 Neurobiology and Behavior II: Introduction to Neurobiology
Spring. 3 or 4 credits. A. Bass.
For description and prerequisites, see BIONB 222.

7. Botany

BIOPL 241 Introductory Botany
Fall. 3 credits. K. J. Niklas.
For description, see BIOPL 241.

8. Physiology and Anatomy

BIOAP 311 Introductory Animal Physiology, Lectures (also VET MED 346)
Fall. 3 credits. E. Loew or staff.
For description and prerequisites, see BIOAP 311.

NS 341 Human Anatomy and Physiology
Spring. 4 credits. Permission only. Must preregister for lab in 309 MVR during CoursEnroll. V. Utermohlen.
For description and prerequisites, see NS 341.

*D. **Biology foundation*** (depth requirement): one course for which one of the above breadth requirement courses (2C) is a prerequisite.

*E. **Statistics*** (one course)

AEM 210 Introductory Statistics
Fall. 4 credits. C. VanEs.
For description and prerequisites, see ARME 210.

BTRY 261 Statistical Methods I
Fall. 4 credits. R. Lloyd.
For description and prerequisites, see BTRY 201.

CRP 223 Introduction to Statistical Reasoning for Urban and Regional Analysis
Fall. 3 credits. J. Lobo.
For description, see CRP 223.

ECON 319 Introduction to Statistics and Probability
Fall. 4 credits. Y. Hong.
For description and prerequisites, see ECON 319.

ILRST 210 Statistics: Statistical Reasoning
Fall, spring. 3 credits. Staff.
For description, see ILRST 210.

MATH 171 Statistical Theory and Application in the Real World
Fall, spring. 4 credits. Staff.
For description, see MATH 171.

PAM 210 Introduction to Statistics
Spring. 4 credits. K. Joyner.
For description, see PAM 210.

PSYCH 350 Statistics and Research Design
Fall. 4 credits. T. Gilovich.
For description, see PSYCH 350.

SOC 301 Evaluating Statistical Evidence (also R SOC 302)
Fall. 4 credits. Staff.
For description, see SOC 301.

III. Core Courses

B&SOC 301 Biology and Society: The Social Construction of Life (also S&TS 401) (III)
Fall. 4 credits. Prerequisite: 2 semesters of social science or humanities and 1 year of introductory biology or permission of instructor. Limited to 75 students. E. Toon.
Critical thinking about the diverse influences shaping the life sciences. Topics include evolution and natural selection, heredity and genetic determinism, biotechnology, and reproductive interventions. We interpret episodes, past and present, in biology in light of scientists' historical location, economic and political interests, use of language, and ideas about causality and responsibility. Readings, class activities, and written assignments are designed so that students develop interpretive skills and explore their own intellectual and practical responses to controversies in biology and society.

S&TS 286 Science and Human Nature (also PHIL 286)
Spring. 4 credits. R. Boyd and N. Sturgeon.
For description, see PHIL 286.

IV. Themes

A. ***Natural Science Issues/Biology Elective*** (two courses). Select from the following list of B&SOC approved Natural Science Issues courses or choose course(s) with intro biology as a prerequisite from: ALS, AN SC, BIOSCI, ENTOM, FOOD, HD, NS, NTRES, PL BR, PL PA, PSYCH, VET MED.

[B&SOC 214 Biological Basis of Sex Differences (also BIOAP 214 and WOMNS 214) (I)
Fall. 3 credits. Next offered spring 2003. J. Fortune.
For description, see BIOAP 214.]

[B&SOC 347 Human Growth and Development: Biological and Behavioral Interactions (also HD 347 and NS 347)
Spring. 3 credits. Offered alternate years. J. D. Haas and S. Robertson.
For description and prerequisites, see HD 347.]

[BIOEE 275 Human Biology and Evolution (also ANTHR 275 and NS 275)
Fall. 3 credits. Not offered 2001–2002. K. A. R. Kennedy and J. D. Haas.
For description, see BIOES 275.]

[BIOEE 474 Laboratory and Field Methods in Human Biology (also ANTHR 474)
Spring. 5 credits. Not offered 2001–2002. K. A. R. Kennedy.
For description, see BIOEE 474.]

[BIOEE 673 Human Evolution: Concepts, History, and Theory (also ANTHR 673)
Fall. 3 credits. Offered alternate years. Not offered fall 2001. K. A. R. Kennedy.
For description, see BIOEE 673.]

BIOPL 247 Ethnobiology
Fall. 3 credits. D. M. Bates.
For description, see BIOPL 247.

HD 266 Emotional Functions of the Brain
Fall. 3 credits. R. Depue.
For description, see HD 266.

HD 344 Infant Behavior and Development
Fall. 3 credits. Not open to freshmen. S. Robertson.
For description and prerequisites, see HD 344.

HD 370 Adult Experimental Psychopathology
Spring. 3 credits. Limited to sophomores, juniors, and seniors. S. Bem.
For description, see HD 370.

HD 436 Language Development (also LING 436, PSYCH 436, and COGST 436)
Spring. 4 credits. B. Lust.
For description, see HD 436.

NS 222 Maternal and Child Nutrition
Fall. 3 credits. Limited to 20. C. Garza.
For description and prerequisites, see NS 222.

NS 331 Physiological and Biochemical Bases of Human Nutrition
Spring. 4 credits. M. Stipanuk.
For description and prerequisites, see NS 331.

NS 361 Biology of Normal and Abnormal Behavior (also PSYCH 361)
Fall. 3 credits. Limited to juniors and seniors only. B. J. Strupp.
For description and prerequisites, see NS 361.

NS 452 Molecular Epidemiology and Dietary Markers of Chronic Disease
Spring. 3 credits. P. Cassano.
For description and prerequisites, see NS 452.

NS 475 Molecular Nutrition and Development
Spring. 3 credits. P. Stover and D. Noden.
For description and prerequisites, see NS 475.

NTRES 201 Environmental Conservation
Spring. 3 credits. T. Fahey.
For description, see NTRES 201.

PSYCH 326 Evolution of Human Behavior
Spring. 4 credits. R. Johnston.
For description and prerequisites, see PSYCH 326.

Examples of biology electives

AN SCI 300 Animal Reproduction and Development
Spring. 3 credits.
For description, see AN SCI 300.

HD 366 Psychobiology of Temperament and Personality
Spring. 3 credits. P. Depue.
For description, see HD 366.

NS 331 Physiological and Biochemical Bases of Human Nutrition
Spring. 4 credits.
For description, see NS 331.

B. ***Humanities/Social Science elective*** (two courses)

Courses listed earlier as social science/humanities foundation courses (2B) are particularly appropriate as social science/humanities electives. However, a single course cannot be used to meet both requirements. Examples of recommended social science or humanities electives are listed below. A more complete list is available in 275 Clark Hall.

Examples of social science electives

AEM 464 Economics of Agricultural Development
Spring. 3 credits. R. Christy.
For description, see ARME 464.

[ANTHRO 211 Nature and Culture
Spring. 3 credits. Not offered 2001–2002.
For description, see ANTHR 211.]

CRP 380 Environmental Politics
Fall. 4 credits. R. S. Booth.
For description, see CRP 380.

HD 251 Social Gerontology
Spring. 3 credits. D. Dempster-McLain.
For description, see HD 251.

NS 245 Social Science Perspectives on Food and Nutrition
Fall. 3 credits. J. Sobal.
For description, see NS 245.

NS 450 Public Health Nutrition
Spring. 3 credits. D. Pelletier.
For description, see NS 450.

NTRES 400 International Environmental Issues
Spring. 4 credits. R. McNeil.
For description, see NTRES 400.

PAM 303 Ecology and Epidemiology of Health
Spring. 3 credits. E. Rodriguez.
For description, see PAM 303.

[PAM 380 Human Sexuality
Spring. 3 credits. Not offered 2001–2002. A. Parrot.
For description, see PAM 380.]

PAM 435 U.S. Health Care System
Fall. 3 credits. R. Battistella.
For description, see PAM 435.

R SOC 205 Rural Sociology and International Development (also SOC 206)
Spring. 3 credits. C. Geisler.
For description, see R SOC 205.

R SOC 220 Sociology of Health and Ethnic Minorities (also LSP 220)
Fall. 3 credits. P. Parra.
For description, see R SOC 220.

[R SOC 490 Society and Survival
Fall. 3 credits. Not offered 2001–2002.
For description, see R SOC 490.]

S&TS 324 Environment and Society (also R SOC 324 and SOC 324)
Spring. 3 credits. L. Glenna.
For description, see R SOC 324.

SOC 340 Health, Behavior, and Policy
Spring. 4 credits. S. Caldwell.
For description, see SOC 340.

Examples of humanities electives

NTRES 407 Religion, Ethics, and the Environment
Fall. 4 credits. R. Baer.
For description, see NTRES 407.

PHIL 241 Ethics (by petition for breadth requirement)
Spring. 4 credits. N. Sturgeon.
For description, see PHIL 241.

[PHIL 368 Global Climate and Global Justice (also GOVT 468)
Fall. 4 credits. Not offered 2001–2002.
For description, see PHIL 368.]

S&TS 681 Philosophy of Science (also PHIL 681)
Spring. 4 credits. R. Boyd.
For description, see PHIL 681.

C. Senior Seminars: Representative seminars listed below. Complete list available in 275 Clark Hall.

B&SOC 406 Biotechnology and the Law (also S&TS 406) (III)
Spring. 4 credits. L. Palmer.
For description, see S&TS 406.

[B&SOC 427 Politics of Environmental Protection in America (also S&TS 427 and GOVT 427) (III)
Fall. 4 credits. Not offered 2001–2002. S. Yearley.
For description, see S&TS 427.]

B&SOC 447 Seminar in the History of Biology (also BIOEE 467, HIST 415, and S&TS 447) (I or III)
Fall and summer (6-week session). 4 credits. W. Provine.
For description, see BIOEE 467.

B&SOC 461 Environmental Policy (also BIOEE 661 and ALS 661) (I)
Fall and spring. 3 credits each term. Limited to 12 students. D. Pimentel.
For description, see BIOEE 661.

[B&SOC 469 Food, Agriculture, and Society (also BIOEE 469 and S&TS 469) (I)
Spring. 3 credits. Not offered 2001–2002.
For description, see BIOEE 469.]

COMM 421 Communication and the Environment
Spring. 3 credits. J. Shanahan.
For description, see COMM 421.

HD 366 Psychobiology of Temperament and Personality
Fall. 3 credits. R. A. Depue.
For description and prerequisites, see HD 366.

HD 418 Psychology of Aging
Fall. 3 credits. S. Cornelius.
For description, see HD 418.

HD 419 Midlife Development
Spring. 3 credits. S. Cornelius.
For description, see HD 419.

HD 464 Sexual Minorities and Human Development (also WOMNS 467)
Spring. 3 credits. R. Savin-Williams.
For description, see HD 464.

[HD 610 Processes in Human Development
Fall. 3 credits. Not offered 2001–2002. N. Bronfenbrenner.
For description and prerequisites, see HD 610.]

HD 660 Social Development
Spring. 3 credits. Permission of instructor required for undergraduates. C. Raver.
For description, see HD 660.

NTRES 411 Seminar in Environmental Ethics
Fall. 3 credits. R. Baer.
For description, see NTRES 411.

PAM 575 Housing and Long Term Care for the Elderly
Fall. 3 credits. P. Chi.
For description, see PAM 575.

[PAM 652 Health Care Services: Consumer and Ethical Perspectives
Fall. 3–4 credits. Not offered 2001–2002. A. Parrot.
If using this course as a senior seminar, B&SOC majors must take it for four credits.
For description, see PAM 652.]

PAM 656 Managed Health Delivery Systems: Primary-Ambulatory Care
Spring. 3 credits. For undergraduate seniors only by permission of instructor. J. Kuder.
For description, see PAM 656.

PAM 659 Epidemiology, Clinical Medicine, and Management Interface Issues
Spring. 3 credits. E. Rodriguez.
For description, see PAM 659.

[R SOC 410 Population and Environment
Spring. 3 credits. Not offered 2001–2002.
For description, see R SOC 410.]

R SOC 438 Social Demography (also SOC 437)
Fall. 3 credits. D. Gurak.
For description, see R SOC 438.

R SOC 495 Population, Development, and Environment in Sub-Saharan Africa
Fall. 4 credits. P. Eloundou-Enyegue.
For description, see R SOC 495.

S&TS 411 Knowledge, Technology, and Property
Spring. 4 credits. S. Hilgartner.
For description and prerequisites, see S&TS 411.

[S&TS 438 Minds, Machines, and Intelligence (also COG ST 438)
Spring. 4 credits. Not offered 2001–2002. H. Mialet.
For description, see S&TS 438.]

[S&TS 466 Public Communication of Science and Technology (also COMM 466)
Fall. 3 credits. Offered even fall semesters. Not offered fall 2001. B. Lewenstein.
For description and prerequisites, see COMM 466.]

[S&TS 490 Integrity of Scientific Practice
Fall. 4 credits. Not offered 2001–2002. S. Hilgartner.
For description, see S&TS 490.]

S&TS 492 Politics and the Public Health
Spring. 4 credits. E. Toon.
For description, see S&TS 492.

S&TS 645 Genetic Engineering: Politics and Society in Comparative Perspective (also GOVT 634)
Spring. 4 credits. S. Hilgartner.
For description, see S&TS 645.

V. Other Courses

B&SOC 375 Independent Study
Fall or spring. 1–4 credits. Prerequisite: must have written permission of faculty supervisor and Biology & Society major.
Projects under the direction of a Biology & Society faculty member are encouraged as part of the program of study within the student's concentration area. Applications for research projects are accepted by individual faculty members. Students may enroll for 1–4 credits in B&SOC 375 (Independent Study) with written permission of the faculty supervisor and may elect either the letter grade or the S-U option. Students may elect to do an independent study project as an alternative to, or in advance of, an honors project. Applications and information on faculty research, scholarly activities, and undergraduate opportunities are available in the Biology & Society Office, 275 Clark Hall. *Independent study credits may not be used in completion of the major requirements.*

B&SOC 400 Undergraduate Seminar
Fall or spring. Variable credit. May be repeated for credit.
From time to time different seminars on topics of interest to undergraduates are offered. Topics and instructors are listed in the Biology & Society supplement issued at the beginning of each semester.

B&SOC 498/499 Honors Project I & II
Fall and spring. 3–5 credits each term. Open only to Biology & Society students in their senior year by permission of the department. Please apply in 275 Clark Hall.
Students who are admitted to the honors program are required to complete two semesters of honors project research and to write an honors thesis. The project must include substantial research and the completed work should be of wider scope and greater originality than is normal for an upper-level course.

Students may take three to five credits per semester up to a maximum of eight credits in B&SOC 498 & 499, Honors Projects I & II. Students should note that these courses are to be taken in addition to those courses that meet the regular major requirements. S&TS 498 includes the fall Honors Seminar. The student and the project supervisor must reach clear agreement at the outset as to what sort of work will need to be completed during the first semester. Minimally, an honors thesis outline and bibliography should be accomplished. At the end of B&SOC 498, Honors Project I, a letter grade will be assigned and the advisers, in consultation with the Director of Undergraduate Studies, will evaluate whether or not the student should continue working on an honors project. Biology & Society students who do continue in the

honors program for the second semester will receive a letter grade at the end of their final term whether or not they complete a thesis and whether or not they are recommended for honors.

Applications and information are available in the Biology & Society Office, 275 Clark Hall.

Cognitive Studies Program

S. Edelman (psychology), R. Hoy (neurobiology and behavior), **J. Halpern (computer science), on leave**, co-directors.
G. Gay (communication); C. Cardie, R. Constable, J. Halpern, D. Huttenlocher, L. Lee, B. Selman, R. Zabih (computer science); A. Hedge (design and environmental analysis); K. Basu, L. Blume, D. Easley (economics); J. Dunn, R. Ripple, D. Schrader (education); S. Wicker (electrical engineering); R. Canfield, S. Ceci, B. Koslowski, B. Lust, S. Robertson, E. Wethington, W. Williams (human development); K. O'Connor, J. Russo (Johnson Graduate School of Management); J. Bowers, A. Cohn, M. Diesing, J. Gair, W. Harbert, S. McConnell-Ginet, C. Rosen, M. Rooth, Y. Shirai, J. Whitman, D. Zec (linguistics); A. Nerode, R. Shore (mathematics); R. Harris-Warrick, H. Howland, R. Hoy, H. K. Reeve (neurobiology and behavior); R. Boyd, C. Ginet, H. Hodes, S. Shoemaker, Z. Szabó, (philosophy); J. Cutting, R. Darlington, T. DeVoogd, D. Dunning, S. Edelman, D. Field, B. Finlay, T. Gilovich, B. Halpern, A. Isen, S. Johnson, R. Johnston, C. Krumhansl, U. Neisser, M. Owren, E. Adkins Regan, M. Spivey (psychology); M. Macy (sociology). G. Babbes, B. Hellie, S. Hertz (associate members).

Cognitive studies is comprised of a number of disciplines that are linked by a major concern with fundamental capacities of the mind, such as perception, memory, reasoning, language, the organization of motor action, and their neural correlates. In the College of Arts and Sciences these disciplines are represented in the departments of Computer Science, Economics, Linguistics, Mathematics, Neurobiology and Behavior, Philosophy, Psychology, and Sociology. Elsewhere in the university they are represented in the Departments of Design and Environmental Analysis and Human Development (College of Human Ecology), the Departments of Communication and Education (College of Agriculture and Life Sciences), and the Johnson Graduate School of Management.

The issues addressed in cognitive studies arise at several levels. At the broadest level are problems of characterizing such basic notions as "mind," "knowledge," "information," and "meaning." At a more specific level are questions regarding the abstract operating principles of individual components of the mind, such as those underlying visual perception, language ability, and understanding of concepts. These principles concern the organization and behavior of the components and how they are biologically represented in the brain. At the most specific level are questions about the properties of the elementary computational structures and processes that constitute these components.

Important insights into issues of these kinds have been achieved in recent years as a result of the various cognitive studies disciplines converging in their theoretical and methodological approaches. It is this convergence, in fact, that warrants grouping the disciplines together under the single term "cognitive studies." Even greater progress can be expected in the future as a consequence of increasing cooperation among the disciplines.

Undergraduate Concentration

An interdisciplinary undergraduate concentration in Cognitive Studies is available to Cornell University undergraduates in the College of Arts and Sciences. Students from other colleges who seek such a concentration should discuss such possibilities with the Cognitive Studies office, which will provide information and contacts concerning such concentrations.

The undergraduate concentration in Cognitive Studies is designed to enable students to engage in a structured program directly related to the scientific study of cognition and the mind. The concentration provides a framework for the design of structured, supervised programs of study in this growing interdisciplinary field. Such programs of study serve as complements to coursework in a single discipline as represented by an individual department. It is considered crucial that students gain a strong background in their major, independent of their work in the concentration. Independent majors and college scholars may also apply. Colleges vary in their procedures for formal recognition of this concentration (contact the Cognitive Studies office for details). The Cognitive Studies Program faculty have designed five structured "tracks" that offer students different ways of satisfying the concentration. In addition, students are always able to construct their own programs of study subject to approval by their concentration adviser. The courses listed under each track are program suggestions. The student should consult with his/her Cognitive Studies adviser to develop a more customized curriculum. In some cases, students may want to combine or cross tracks.

In general, it is expected that students in the concentration will take COGST 101, a lab course such as COGST 201, and three courses at the 300 or 400 level in at least two departments. Even though only five courses are required to complete the concentration, we expect that students interested in cognitive studies will often end up taking more, and we encourage them to do an independent research project (COGST 470) and a research workshop such as COGST 471.

The five typical tracks are as follows. The first track involves a particular approach to the study of cognition. The other four tracks are structured around specific content domains and consist of sets of suggested course clusters. Please note that many of these courses have substantial prerequisites.

1. Cognitive Studies in Context: The Workplace, the Classroom, and Everyday Life

   Foundational issues in cognitive science are intimately relevant to real world settings. The Cognitive Studies in Context track offers students the opportunity to learn and independently explore how theory and research on the mind can help us better understand how we use information in much of our daily activities, whether it be the workplace, the classroom, or any other aspect of everyday life. Students will come to better understand the cognitive ergonomics of such diverse settings as an aircraft cockpit, a quality control station on an assembly line, or an anesthesia station in a surgical suite. They will come to better understand the perceptual constraints that help tailor the nature of visual communication systems, or the linguistic constraints that help tailor text-based communication. They will come to see how the functional architecture of human memory guides the presentation and use of information in a wide array of settings. They will also learn how design constraints on computer hardware and software interact with human capacities and biases.

   COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102, Introduction to Cognitive Science
   COGST 201/COM S 201/PSYCH 201, Cognitive Science in Context Laboratory

   In addition, three more upper-level approved courses in Cognitive Studies areas will normally be expected.

2. Perception and Cognition

   This track focuses on psychological, computational, and neurobiological approaches to the interface between perception and cognition. Students will develop a grasp of the continuum between sensory impressions and complex thought.

   COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102, Introduction to Cognitive Science
   COGST 201/COM S 201/PSYCH 201, Cognitive Science in Context Laboratory
   COGST 342/PSYCH 342, Human Perception: Applications to Computer Graphics, Art, and Visual Display
   COGST 416/PSYCH 416, Modeling Perception and Cognition
   COGST 450/HD 437/LING 450/PSYCH 437, Lab Course: Language Development
   BIONB 326, The Visual System
   PSYCH 305, Visual Perception
   PSYCH 316, Auditory Perception
   PSYCH 412, Laboratory in Cognition and Perception
   PSYCH 418, Psychology of Music
   PSYCH 419, Neural Networks Laboratory

3. Language and Cognition

   This track focuses on the representation, processing, and acquisition and learning of language, as well as its role in cognition and culture. Students will acquire skills and knowledge in formal and applied linguistic theory, psycholinguistic experimentation, and computational modeling techniques.

   COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102, Introduction to Cognitive Science
   COGST 201/COM S 201/PSYCH 201, Cognitive Science in Context Laboratory
   COGST 270/LING 270/PHIL 270, Truth and Interpretation
   COGST 416/PSYCH 416, Modeling Perception and Cognition
   COGST 436/HD 436/LING 436/PSYCH 436, Language Development

COGST 450/HD 437/LING 450/PSYCH 437, Lab Course: Language Development
COM S 411, Programming Languages and Logics
LING 203, Introduction to Syntax and Semantics
LING 301–302, Phonology I & II
LING 303–304, Syntax I & II
LING 309, Morphology
LING 319–320, Phonetics I & II
LING 325, Pragmatics
LING 403, Introduction to Applied Linguistics
LING 421–422, Semantics I & II
PHIL 332, Philosophy of Language
PSYCH 415, Concepts, Categories, and Word Meanings

4. Cognition and Information Processing

This track focuses on how the mind (or a computer) can encode, represent, and store information. Students will develop an understanding of concepts, categories, memory, and the nature of information itself.

COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102, Introduction to Cognitive Science
COGST 201/COM S 201/PSYCH 201, Cognitive Science in Context Laboratory
COGST 414/PSYCH 414, Comparative Cognition
COGST 416/PSYCH 416, Modeling Perception and Cognition
COGST 450/HD 437/LING 450/PSYCH 437, Lab Course: Language Development
COM S 211, Computers and Programming
COM S 212, Structure and Interpretation of Computer Programs
COM S 472, Foundations of Artificial Intelligence
COM S 473, Practicum in Artificial Intelligence
PHIL 262, Philosophy of Mind
PHIL 362, Philosophy of Mind
PSYCH 311, Introduction to Human Memory
PSYCH 412, Laboratory in Cognition and Perception
PSYCH 413, Information Processing: Conscious and Nonconscious
PSYCH 415, Concepts, Categories, and Word Meanings
PSYCH 417, The Origins of Thought and Knowledge

5. Cognitive Neuroscience

This track focuses on neurobiological and computational approaches to understanding how perception and cognition emerge in the human brain. Students will acquire knowledge of what neural structures subserve what perceptual/cognitive processes, and how they interact.

COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102, Introduction to Cognitive Science
COGST 201/COM S 201/PSYCH 201, Cognitive Science in Context Laboratory
COGST 416/PSYCH 416, Modeling Perception and Cognition
COM S 401, Programming Languages and Software Engineering
PSYCH 332/BIONB 328, Biopsychology of Learning and Memory
PSYCH 396/BIONB 396, Introduction to Sensory Systems
PSYCH 419, Neural Networks Laboratory
PSYCH 425, Cognitive Neuroscience
PSYCH 440, The Brain and Sleep

A Cognitive Studies undergraduate laboratory and computer facility is available for all students in a Cognitive Studies concentration. This facility will help link resources from different laboratories across the Cornell campus as well as providing a central location for developing and conducting experimental research in cognitive studies.

Students who complete the concentration requirements will have their concentration in Cognitive Studies officially represented on their transcript. In addition, students who have made very substantial progress towards completing the requirements for the concentration will be eligible for enrollment in the graduate courses in Cognitive Studies during their senior year.

Concentration Application Procedures. Initial inquiries concerning the undergraduate concentration should be made to the Cognitive Studies Program coordinator, Linda LeVan, cogst@cornell.edu, 255–6431, who will provide application materials and set up a meeting with a relevant member of the Undergraduate Concentration Committee. This Committee will assist the student with selection of a concentration adviser with expertise in the student's main area of interest.

To formally initiate the concentration in Cognitive Studies, a student must gain approval for a selection of courses from a concentration adviser (one of the program faculty). The courses selected must form a coherent cluster that makes sense to both the adviser and the student. To be admitted to the concentration, the student must submit this plan of study to the Cognitive Studies undergraduate faculty committee for final approval.

In addition to assisting in and approving the student's selection of courses, the concentration adviser serves as a general source of information about the field of cognitive studies, relevant resources around the university, and job and graduate school opportunities. Often, the adviser can help the student develop independent research experience.

Independent Research. The concentration encourages each student to be involved in independent research that bears on research issues in cognitive studies, if possible. COGST 470 is available for this purpose. It is recommended that students report on their research activities in an annual undergraduate forum. The Undergraduate Concentration Committee is committed to helping students find an appropriate research placement when needed.

The Committee for Undergraduate Concentration in Cognitive Studies consists of: Bart Selman, computer science, 5–5643, 4144 Upson Hall, selman@cs.cornell.edu; Draga Zec, linguistics, 5–0728, 217 Morrill Hall, DZ17@cornell.edu; Zoltán Szabó, philosophy, 5–6824, 218 Goldwin Smith, ZS15@cornell.edu; Michael Owren, psychology, 5–3835, 224 Uris Hall, MJO9@cornell.edu. The current Director of Undergraduate Studies is Draga Zec.

Graduate Minor

For information, consult the program office (282 Uris Hall, 255–6431, cogst@cornell.edu) or the directors of graduate studies, Shimon Edelman and Ron Hoy, 255–6365 or 254–4318; se37@cornell.edu or rrh3@cornell.edu.

Courses

Cognitive Studies

COGST 101 Introduction to Cognitive Science (also COM S 101, LING 170, PHIL 191, and PSYCH 102) (III)
Fall. 3 or 4 credits (the 4-credit option involves a writing section instead of taking exams). M. Spivey.
This course surveys the study of how the mind/brain works. We examine how intelligent information processing can arise from biological and artificial systems. The course draws primarily from five disciplines that make major contributions to cognitive science: philosophy, psychology, neuroscience, linguistics, and computer science. The first part of the course introduces the roles played by these disciplines in cognitive science. The second part of the course focuses on how each of these disciplines contributes to the study of five topics in cognitive science: language, vision, learning and memory, action, and artificial intelligence.

COGST 111 Brain, Mind, and Behavior (also BIONB 111 and PSYCH 111) (I)
Spring. 3 credits. Letter grade only. Intended for freshman and sophomores in the humanities and social sciences; seniors by permission only. Not recommended for psychology majors; biology majors may not use the course for credit toward the major. R. Hoy and E. Adkins Regan.
Understanding how the brain creates complex human behavior and mental life is a great scientific frontier of the next century. This course enables students with little scientific background from any college or major to appreciate the excitement. What are the interesting and important questions? How are researchers trying to answer them? What are they discovering? Why did the brain evolve this remarkable capacity?

COGST 201 Cognitive Science in Context Laboratory (also COM S 201 and PSYCH 201) (III)
Spring. 4 credits. Prerequisite: "Introduction to Cognitive Science" COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102. Knowledge of programming languages is not assumed. Limited to 24 students. D. Field and staff.
A laboratory course that explores the theories of cognitive science and provides direct experience with the techniques of cognitive science, in relation to the full range of both present and anticipated future activities in the workplace, the classroom, and in everyday life. Discussions of laboratory exercise results, supplementation of laboratory topics, and analyses of challenging primary research literature are done in meetings of the entire class. Laboratory exercises, which are done on an individual or small group basis, include both pre-planned investigations and student-developed experiments. Use of digital computers as well as the Internet, e-mail, and web sites are integral components of the course.

The focus is on human-computer interactions that are intended to permit effective and efficient exchange of information and control of functions or operations. This approach is applied to real life settings. Students are

expected to come to each discussion meeting having read and thought about assigned materials, and to come to scheduled laboratory meetings fully prepared to perform the laboratory exercises. Laboratory facilities are available to students at all times so that statistical analysis of data, preparation of laboratory reports, and collection of experimental data will be facilitated.

COGST 214 Issues in Cognitive Psychology (also PSYCH 214 and 614) (III)

Fall. 3 or 4 credits. The 4-credit option involves some participation in COGST/PSYCH 501. Sophomore standing required. Limited to 150 students. S. Edelman.

The course serves as a broad overview of problems arising in the study of cognition and of the information-processing, or computational, approaches to solving these problems, in natural and artificial cognitive systems. Theoretical and experimental challenges posed by the understanding of perception, attention and consciousness, memory, thinking, and language are discussed and analyzed. Participants acquire conceptual tools essential for following the current debates on the nature of mind and its relationship to the brain.

[COGST 264 Language, Mind, and Brain (also LING 264) (III)

Spring. 4 credits. Not offered 2001–2002. J. Bowers.

An introductory course that emphasizes the formal structure of natural language in the Minimalist framework. The following topics are covered: the formal representation of linguistic knowledge, principles, and parameters of Universal Grammar, the basic biology of language, mechanisms of linguistic performance, the modularity hypothesis, and language and cognition. The course is especially suited for majors in fields such as psychology, philosophy, computer science, and linguistics (and also for those enrolled in the concentration in cognitive studies) who want to take a one-semester introduction to linguistics that concentrates on the formal principles that govern linguistic knowledge, along with some discussion of their biological realization and their use in perception and production.]

[COGST 270 Truth and Interpretation (also LING 270 and PHIL 270) (III or IV)

Spring. 4 credits. Not offered 2001–2002.]

[COGST 333 Problems in Semantics—Quantification in Natural Language (also LING 333 and PHIL 333) (III or IV)

Spring. 4 credits. Prerequisites: a previous course in formal semantics (e.g., LING 421) or logic (e.g., PHIL 231) or permission of instructor. Not offered 2001–2002. S. McConnell-Ginet and Z. G. Szabó.

This course looks at problems in the semantic analysis of natural languages, critically examining work in linguistics and philosophy on particular topics of current interest. The focus is on quantification. Languages offer a variety of resources for expressing generalizations: *some, every, no, many,* and other quantifying expressions that appear inside noun phrases; *always, never, occasionally,* and other adverbial quantifying expressions not associated with particular nominals; constructional resources of various kinds (e.g., English free relatives like *whatever she cooks*). How different are these resources and what might they imply about basic cognitive and linguistic capacities?]

COGST 342 Human Perception: Applications to Computer Graphics, Art, and Visual Display (also PSYCH 342 and 642) (III)

Fall. 3 or 4 credits. The 4-credit option involves a term paper. Prerequisite: PSYCH 101 or permission of instructor. PSYCH 205 strongly recommended. D. Field.

Our present technology allows us to transmit and display information through a variety of media. To make the most of these media channels, it is important to consider the limitations and abilities of the human observer. The course considers a number of applied aspects of human perception with an emphasis on the display of visual information. Topics covered include: "three-dimensional" display systems, color theory, spatial and temporal limitations of the visual systems, attempts at subliminal communication, and "visual" effects in film and television.

COGST 414 Comparative Cognition (also PSYCH 414 and 714) (III)

Spring. 3 credits. Prerequisites: PSYCH 205, 209, 214, or permission of instructor. M. Owren.

This course examines some of the conceptual and empirical work resulting from and fueling the recent surge of interest in animals' thinking. Specific topics may include whether nonhumans behave intentionally; whether they show concept and category learning, memory, and abstract thinking similar to that of humans; the role of social cognition in the evolution of intelligence; and whether animals are conscious or self-aware. Evidence from communication studies in which animal signals provide a "window on the mind" plays a strong role in the deliberations, including studies of naturally occurring signaling in various species and experiments in which nonhumans are trained in human-like language behavior. Cognition in nonhuman primates is a specific focus throughout. The course is a mix of lecture and discussion, emphasizing the latter as much as possible.

COGST 416 Modeling Perception and Cognition (also PSYCH 416 and 616) (III)

Spring. 4 credits. Prerequisites: PSYCH 205, 209, 214, or 215, or permission of instructor. M. Spivey.

This course offers a survey of several computational approaches to understanding perception and cognition. We explore linear systems analysis, connectionist models, dynamical systems, and production systems, to name a few. Emphasis is placed on how complex sensory information gets represented in these models, as well as how it gets processed. This course covers computational accounts of language processing, language acquisition, visual perception, and visual development, among other topics. Students complete a final project that applies a computational model to some perceptual/cognitive phenomena.

COGST 424 Computational Linguistics (also COM S 424 and LING 424) (III)

Spring. 4 credits. Prerequisite: LING 203. Labs involve work in the Unix environment; COM S 114 is recommended. M. Rooth.

Steady progress in formalisms, algorithms, linguistic knowledge, and computer technology is bringing computational mastery of the syntax, morphology, and phonology of natural languages within reach. The course introduces methods for "doing a language" computationally, with an emphasis on approaches which combine linguistic knowledge with powerful computational formalisms. Topics include: computational grammars, parsing, representation of syntactic analyses; finite state morphology; weighted grammars; feature constraint formalisms for syntax; treebank and other markup methodology; robust low-level syntax and semantics; and experimental-modeling methodology using large data samples.

COGST 436 Language Development (also HD 436, LING 436, and PSYCH 436) (III)

Spring. 4 credits. Open to undergraduate and graduate students. Graduate students should also enroll in HD 633, LING 700, or PSYCH 600, a supplemental graduate seminar. Prerequisite: at least one course in developmental psychology, cognitive psychology, cognitive development, or linguistics. S-U grades optional. B. Lust.

This course surveys basic issues, methods, and research in the study of first-language acquisition. Major theoretical positions in the field are considered in the light of experimental studies in first-language acquisition of phonology, syntax, and semantics from infancy on. The fundamental linguistic issues of "Universal Grammar" and the biological foundations for acquisition are discussed, as are the issues of relations between language and thought. The acquisition of communication systems in nonhuman species such as chimpanzees is addressed, but major emphasis is on the child. An optional lab course supplement is available (see COGST 450/HD 437/LING 450/PSYCH 437).

COGST 438 Minds, Machines, and Intelligence (also S&TS 438) (III)

Spring. 4 credits. H. Mialet.

Do machines think? Do they have minds? Are they intelligent? What can humans do that machines can't do and vice versa? How do humans use machines and how do machines use humans? In this course we focus on how philosophers such as Turing, Searle, Dreyfus etc. have dealt with these questions. At the same time, however, we are also concerned with trying to rethink the themes raised by these thinkers in light of social scientists who have studied how people and machines interact in specific (local) contexts, as for example, in a plane's cockpit or on the Internet. Topics may also include virtual surgery, speech recognition, and expert systems in medicine.

COGST 450 Lab Course: Language Development (also HD 437, LING 450, and PSYCH 437)

Spring. 2 credits. In conjunction with COGST/HD/LING/PSYCH 436, Language Development. B. Lust.

This laboratory course is an optional supplement to the survey course, Language Development (COGST/HD/LING/PSYCH 436). The lab course provides students with a hands-on introduction to scientific research, including design and methods, in the area of first language acquisition.

COGST 465 Topics in High-Level Vision (also COM S 392 and PSYCH 465) (III)

Spring. 4 credits. S. Edelman.

High-level vision is a field of study concerned with functions such as visual object recognition and categorization, scene understanding, and reasoning about visual structure. It is an essentially cross-disciplinary endeavor, drawing on concepts and methods from neuroanatomy and neurophysiology, cognitive psychology, applied mathematics, computer science, and philosophy. The course concentrates on a critical examination of a collection of research publications, linked by a common thread, from the diverse perspectives offered by the different disciplines. Students write bi-weekly commentaries on the assigned papers, and a term paper integrating the material covered in class.

COGST 470 Undergraduate Research in Cognitive Studies
Fall or spring. 1–4 credits. S-U grades optional. Prerequisite: permission of major adviser; written permission of Cognitive Studies faculty member who will supervise the research and assign the grade. Hours TBA. Cognitive Studies faculty.
Experience in planning, conducting, and reporting independent laboratory, field, and/or library research in an interdisciplinary area relevant to cognitive studies.

COGST 471 Cognitive Studies Research Workshop
Fall or spring. Credits variable. Prerequisites: student must be enrolled in an independent research course (either in Cognitive Studies, e.g., COGST 470, or in a related department), or in honors thesis research in one of the departments relevant to Cognitive Studies. Staff. (Interdisciplinary faculty from Cognitive Studies Program).
This course provides a research workshop in which undergraduate students who are engaged in research in a particular area relevant to cognitive science can meet across disciplines to learn and practice the essentials of research, using interdisciplinary approaches. In this workshop, students critique and discuss the existing literature in a field of inquiry, individual students present their research designs, methods, and results from their independent research studies, debate the interpretation of their research results, and participate in the generation of new research hypotheses and designs, in a peer group of other undergraduate students involved in related research.

COGST 474 Introduction to Natural Language Processing (also COM S 474 and LING 474) (III)
Spring. 4 credits. M. Rooth.
The course presents formalisms, algorithms, and methodology for manipulating natural languages computationally. It emphasizes parts of natural language (syntax and morphology, but not semantics) where algorithms and scientific understanding make it possible for us to create and implement approximately complete accounts of linguistic phenomena and also manipulate large samples of language use (a million or a billion words). Most of the methods are not only useful for engineering applications but also advance our scientific understanding of human languages.

Computer Science

COM S 101 Introduction to Cognitive Science (also COGST 101, LING 170, PHIL 191, and PSYCH 102)
Fall. 3 or 4 credits. M. Spivey.

COM S 201 Cognitive Science in Context Laboratory (also COGST 201 and PSYCH 201)
Spring. 4 credits. D. Field and staff.

COM S 211 Computers and Programming
Fall, spring, or summer. 3 credits.

COM S 312 Structure and Interpretation of Computer Programs
Fall or spring. 4 credits.

COM S 381 Introduction to Theory of Computing
Fall or summer. 4 credits.

COM S 392 Topics in High-Level Vision (also COGST 465 and PSYCH 465)
Fall. 4 credits. S. Edelman.

COM S 411 Programming Languages and Logics
Fall. 4 credits. Not offered every year.

COM S 424 Computational Linguistics (also COGST 424 and LING 424)
Spring. 4 credits. M. Rooth.

COM S 472 Foundations of Artificial Intelligence
Fall. 3 credits.

COM S 473 Practicum in Artificial Intelligence
Fall. 2 credits.

COM S 474 Introduction to Natural Language Processing (also COGST 474 and LING 474)
Spring. 4 credits. M. Rooth.

COM S 478 Machine Learning
Spring. 3 credits.

COM S 481 Introduction to Theory of Computing
Fall. 4 credits.

COM S 486 Applied Logic (also MATH 486)
Spring. 4 credits.

Education (College of Agriculture and Life Sciences)

[EDUC 210 Psychology of Learning and Memory
Fall. 3 credits. Not offered 2001–2002. J. Dunn.]

EDUC 212 Psychological Foundations of Education
Spring. 2–3 credits. J. Dunn.

EDUC 311 Educational Psychology
Fall. 3 credits. D. Schrader.

Human Development (College of Human Ecology)

HD 115 Human Development
Fall or summer. 3 credits.

HD 266 Emotional Functions of the Brain
Fall. 3 credits.

HD 334 The Growth of the Mind
Spring. 4 credits. B. Lust.

HD 344 Infant Behavior and Development
Fall. 3 credits. S. Robertson.

HD 347 Human Growth and Development: Biological and Behavioral Interactions (also B&SOC 347 and NS 347)
Spring. 3 credits. S. Robertson and J. Haas.

HD 362 Human Bonding
Fall. 3 credits.

HD 436 Language Development (also COGST 436, LING 436, and PSYCH 436)
Spring. 4 credits. B. Lust.

HD 437 Lab Course: Language Development (also COGST 450, LING 450, and PSYCH 437)
Spring. 2 credits. In conjunction with COGST/HD/LING/PSYCH 436, Language Development. B. Lust.

HD 438 Thinking and Reasoning
Fall. 3 credits. B. Koslowski.

HD 439 Cognitive Development: Infancy through Adolescence
Spring. 3 credits. B. Koslowski.

Linguistics

LING 101 Introduction to Linguistics
Fall or spring. 4 credits. Fall, J. Whitman; spring, M. Diesing.

LING 170 Introduction to Cognitive Science (also COGST 101, COM S 101, PHIL 191, and PSYCH 102)
Fall. 3 or 4 credits. M. Spivey.

LING 201 Introduction to Phonetics and Phonology
Spring. 4 credits. A. Cohn.

LING 203 Introduction to Syntax and Semantics
Fall. 4 credits. M. Diesing.

[LING 264 Language, Mind, and Brain (also COGST 264)
Spring. 4 credits. Not offered 2001–2002. J. Bowers.]

[LING 270 Truth and Interpretation (also COGST 270 and PHIL 270)
Spring. 4 credits. Not offered 2001–2002.]

LING 301–302 Phonology I, II
Fall and spring. 4 credits each term. Fall, A. Cohn; spring, D. Zec.

LING 303–304 Syntax I, II
Fall and spring. 4 credits each term. Fall, C. Collins/J. Whitman; spring, M. Diesing.

LING 309 Morphology
Fall. 4 credits. D. Zec.

LING 319 Phonetics I
Fall. 4 credits

LING 320 Phonetics II
Spring. 4 credits.

LING 325 Pragmatics
Fall. 4 credits. S. McConnell-Ginet.

[LING 333 Problems in Semantics—Quantification in Natural Language (also COGST 333 and PHIL 333)
Spring. 4 credits. Not offered 2001–2002. S. McConnell-Ginet and Z. Szabó.]

LING 401 Language Typology
Spring. 4 credits. C. Rosen.

LING 414 Second Language Acquisition I (also ASIAN 414)
Spring. 4 credits. Y. Shirai.

LING 415 Second Language Acquisition II (also ASIAN 417)
Spring. 4 credits. Y. Shirai.

LING 421 Semantics I
Spring. 4 credits.

LING 422 Semantics II
Fall. 4 credits.

LING 424 Computational Linguistics (also COGST 424 and COM S 424)
Spring. 4 credits. M. Rooth.

[LING 425 Corpra and Applied Linguistics (also ASIAN 425)
Fall. 4 credits. Not offered 2001–2002.]

LING 436 Language Development (also COGST 436, HD 436, and PSYCH 436)
Spring. 4 credits. B. Lust.

LING 450 Lab Course: Language Development (also COGST 450, HD 437, and PSYCH 437)
Spring. 2 credits. In conjunction with COGST/HD/LING/PSYCH 436, Language Development. B. Lust.

LING 474 Introduction to Natural Language Processing (also COGST 474 and COM S 474)
Spring. 4 credits. M. Rooth.

Mathematics

MATH 281 Deductive Logic (also PHIL 331)
Fall. 4 credits. H. Hodes.

MATH 384 Foundations of Mathematics (also PHIL 434)
Fall. 4 credits. H. Hodes.

MATH 481 Mathematical Logic (also PHIL 431)
Spring. 4 credits.

MATH 482 Topics in Logic (also PHIL 432)
Spring. 4 credits. H. Hodes.

MATH 483 Intensional Logic (also PHIL 436)
Spring. 4 credits.

MATH 486 Applied Logic (also COM S 486)
Spring. 4 credits.

Neurobiology and Behavior

BIONB 111 Brain, Mind, and Behavior (also COGST 111 and PSYCH 111)
Spring. 3 credits. R. Hoy and E. Adkins Regan.

BIONB 221 Neurobiology and Behavior I: Introduction to Behavior
Fall. 3 or 4 credits.

BIONB 222 Neurobiology and Behavior II: Introduction to Neurobiology
Spring. 3 or 4 credits.

BIONB 326 The Visual System
Spring. 4 credits. H. Howland.

BIONB 328 Biopsychology of Learning and Memory (also PSYCH 332)
Spring. 3 credits. T. DeVoogd.

BIONB 392 Drugs and the Brain
Spring. 4 credits. R. Harris-Warrick.

BIONB 396 Introduction to Sensory Systems (also PSYCH 396)
Spring. 3 or 4 credits. B. Halpern.

[BIONB 421 Effects of Aging on Sensory and Perceptual Systems (also PSYCH 431 and 631)
Fall. 3 or 4 credits. Not offered 2001–2002. B. Halpern.]

BIONB 424 Neuroethology (also PSYCH 424)
Spring. 4 credits.

[BIONB 426 Animal Communication
Spring. 4 credits. Not offered 2001–2002.]

[BIONB 492 Sensory Function (also PSYCH 492)
Spring. 3 or 4 credits. Not offered 2001–2002. B. Halpern and H. Howland.]

[BIONB 496 Bioacoustic Signals in Animals and Man
Spring. 3 credits. Not offered 2001–2002.]

Philosophy

PHIL 191 Introduction to Cognitive Science (also COGST 101, COM S 101, LING 170, and PSYCH 102)
Fall. 3 or 4 credits. M. Spivey.

PHIL 231 Introduction to Deductive Logic
Fall. 4 credits.

PHIL 261 Knowledge and Reality
Fall. 4 credits.

PHIL 262 Philosophy of Mind
Fall. 4 credits. B. Hellie.

[PHIL 270 Truth and Interpretation (also COGST 270 and LING 270)
Spring. 4 credits. Not offered 2001–2002.]

PHIL 286 Science and Human Nature (also S&TS 286)
Spring. 4 credits. R. Boyd.

[PHIL 318 Twentieth-Century Philosophy
Spring. 4 credits. Not offered 2001–2002.]

PHIL 331 Deductive Logic (also MATH 281)
Fall. 4 credits. H. Hodes.

PHIL 332 Philosophy of Language
Fall. 4 credits. Z. Szabó.

[PHIL 333 Problems in Semantics—Quantification in Natural Language (also COGST 333 and LING 333)
Spring. 4 credits. Not offered 2001–2002. S. McConnell-Ginet and Z. Szabó.]

PHIL 361 Epistemology
Fall. 4 credits.

[PHIL 362 Philosophy of Mind
Spring. 4 credits. Not offered 2001–2002. S. Shoemaker.]

PHIL 381 Philosophy of Science: Knowledge and Objectivity (also S&TS 381)
Fall. 4 credits. R. Boyd.

[PHIL 382 Philosophy and Psychology
4 credits. Not offered 2001–2002.]

[PHIL 389 Philosophy of Science: Evidence and Explanation
4 credits. Not offered 2001–2002.]

[PHIL 431 Mathematical Logic (also MATH 481)
Spring. 4 credits. Not offered 2001–2002.]

[PHIL 432 Topics in Logic (also MATH 482)
Spring. 4 credits. Not offered 2001–2002. H. Hodes.]

[PHIL 433 Philosophy of Logic
Spring. 4 credits. Not offered 2001–2002.]

PHIL 434 Foundations of Mathematics (also MATH 384)
Fall. 4 credits. H. Hodes.

PHIL 436 Intensional Logic (also MATH 483)
Spring. 4 credits.

[PHIL 437 Problems in the Philosophy of Language
Spring. 4 credits. Not offered 2001–2002.]

[PHIL 461 Metaphysics
Spring. 4 credits. Not offered 2001–2002.]

Psychology

PSYCH 102 Introduction to Cognitive Science (also COGST 101, COM S 101, LING 170, and PHIL 191)
Fall. 3 or 4 credits. M. Spivey.

PSYCH 111 Brain, Mind, and Behavior (also BIONB 111 and COGST 111)
Spring. 3 credits. R. Hoy and E. Adkins Regan.

PSYCH 201 Cognitive Science in Context Laboratory (also COGST 201 and COM S 201)
Spring. 4 credits. D. Field and staff.

PSYCH 205 Perception (also PSYCH 605)
Spring. 3 credits. J. Cutting.

PSYCH 209 Development (also PSYCH 709)
Spring. 4 credits. S. Johnson.

PSYCH 214 Issues in Cognitive Psychology (also COGST 214 and PSYCH 614)
Fall. 3 or 4 credits. S. Edelman.

PSYCH 223 Introduction to Biopsychology
Fall. 3 credits. M. Owren.

PSYCH 305 Visual Perception
Fall. 4 credits. J. Cutting.

[PSYCH 311 Introduction to Human Memory (also PSYCH 611)
Spring. 3 credits. Not offered 2001–2002.]

PSYCH 316 Auditory Perception (also PSYCH 716)
Fall. 3 or 4 credits. C. Krumhansl.

PSYCH 326 Evolution of Human Behavior (also PSYCH 626)
Fall. 4 credits. R. Johnston.

PSYCH 332 Biopsychology of Learning and Memory (also BIONB 328 and PSYCH 632)
Spring. 3 credits. T. DeVoogd.

PSYCH 342 Human Perception: Applications to Computer Graphics, Art, and Visual Display (also COGST 342 and PSYCH 642)
Fall. 3 or 4 credits. D. Field.

PSYCH 361 Biopsychology of Normal and Abnormal Behavior (also NS 361)
Fall. 3 credits. B. J. Strupp.

PSYCH 396 Introduction to Sensory Systems (also BIONB 396 and PSYCH 696)
Spring. 3 or 4 credits. B. Halpern.

[PSYCH 412 Laboratory in Cognition and Perception (also PSYCH 612)
Spring. 4 credits. Not offered 2001–2002. D. Field.]

[PSYCH 413 Information Processing: Conscious and Nonconscious
Spring. 4 credits. Not offered 2001–2002.]

PSYCH 414 Comparative Cognition (also COGST 414 and PSYCH 714)
Spring. 3 credits. M. Owren.

[PSYCH 415 Concepts, Categories, and Word Meanings (also PSYCH 615)
Fall. 4 credits. Not offered 2001–2002.]

PSYCH 416 Modeling Perception and Cognition (also COGST 416 and PSYCH 616)
Spring. 4 credits. M. Spivey.

PSYCH 417 The Origins of Thought and Knowledge (also PSYCH 717)
Fall. 4 credits. S. Johnson.

[PSYCH 418 Psychology of Music (also PSYCH 618)
Spring. 3 or 4 credits. Not offered 2001–2002. C. Krumhansl.]

PSYCH 424 Neuroethology (also BIONB 424)
Spring. 4 credits.

PSYCH 425 Cognitive Neuroscience (also PSYCH 625)
Fall. 4 credits. B. Finlay.

[PSYCH 431 Effects of Aging on Sensory and Perceptual Systems (also BIONB 421 and PSYCH 631)
Fall. 3 or 4 credits. Not offered 2001–2002. B. Halpern.]

PSYCH 436 Language Development (also COGST 436, HD 436, and LING 436)
Spring. 4 credits. B. Lust.

PSYCH 437 Lab Course: Language Development (also COGST 450, HD 437, and LING 450)
Spring. 2 credits. In conjunction with COGST/HD/LING/PSYCH 436, Language Development. B. Lust.

PSYCH 465 Topics in High-Level Vision (also COGST 465 and COM S 392)
Fall. 4 credits. S. Edelman.

PSYCH 491 Research Methods in Psychology (also PSYCH 691)
Spring. 4 credits. D. Dunning.

[PSYCH 492 Sensory Function (also BIONB 492 and PSYCH 692)
Spring. 4 credits. Not offered 2001–2002. B. Halpern and H. Howland.]

Sociology

[SOC 480 Identity and Interest in Collective Action (also SOC 580)
Fall. 4 credits. Not offered 2001–2002. M. Macy.]

Graduate Courses and Seminars

The following courses and seminars are generally for graduate students only. However, some may be appropriate for advanced undergraduates. The director of the concentration must approve an undergraduate's use of any of these for satisfying the concentration requirements.

COGST 501 Cognition (also PSYCH 501)
Fall. 4 credits. Concurrent or prior registration in COGST 101 (also COM S 101, LING 170, PHIL 191, and PSYCH 102) Introduction to Cognitive Science, is required. Co-meets with PSYCH 614, Issues in Cognitive Psychology. S. Edelman.
This course introduces graduate students interested in cognition (especially those who plan to pursue the Cognitive Studies minor) to the central issues in computational cognitive psychology. It consists of a series of advanced-level discussions of selected examples from the material covered in COGST 101 (also COM S 101, LING 170, PHIL 191, and PSYCH 102) and COGST 214 (also PSYCH 214/614). The material from those courses includes perception, attention and consciousness, memory, thinking, and language. The course focuses on the development of skills required for critical evaluation of research in cognitive sciences, backed by an in-depth understanding of the relevant concepts and theories.

COGST 530 Representation of Structure in Vision and Language (also LING 530 and PSYCH 530)
Spring. 4 credits. Graduate seminar. Enrollment limited to 13 graduate students. Prerequisites: a course each in cognitive psychology, linguistics, and computer science, or permission of instructor. S. Edelman.
The seminar concentrates on the nature of the representation of visual objects and scenes in the brain and compares it with the structural framework that serves as the main explanatory tool in current theories of language processing. Data and ideas are drawn from visual psychophysics, neurophysiology, psycholinguistics, computational vision and linguistics, and philosophy. Students present published research papers and preprints, which are then discussed and critiqued.

COGST 531 Topics in Cognitive Studies (also LING 531 and PSYCH 531)
Spring. 4 credits. Cognitive Studies Program staff.
This seminar series takes advantage of the wide range of expertise and research interests of the faculty members of the Cognitive Studies Program. Every time it is offered, the seminar concentrates on a cluster of issues that span disciplines from Neurobiology and Behavior, through Psychology and Linguistics, to Computer Science and Philosophy. Each meeting consists of a short background presentation, followed by a seminar-style discussion of a chosen issue, exemplified by a current research publication. Students submit weekly essays discussing the assigned publications, and a term paper integrating the various topics covered.

COGST 633 Language Acquisition Seminar (also LING 633)
Fall. 4 credits. Prerequisite: COGST/HD/LING/PSYCH 436 or equivalent, or permission of instructor. B. Lust.

[COGST 773–774 Proseminar in Cognitive Studies I and II (also COM S 773/774, LING 773/774, PHIL 773/774, and PSYCH 773/774)
Fall: R grade; spring: S-U only. 4 credits. Not offered 2001–2002.
The Cognitive Studies Proseminar consists of two semesters of meetings with the graduate faculty in the field of Cognitive Studies. The proseminar provides a general introduction to the field of Cognitive Studies including an introduction to each of the major disciplines that comprise the minor: i.e., computer science, linguistics, philosophy, and psychology. In each of these disciplines, faculty from the field introduce theoretical and methodological issues that underlie the field and its relation to Cognitive Studies; in addition, they introduce various labs in which active research is being conducted in their field at Cornell, and current issues of interdisciplinary interest.

The proseminar includes suggestions from faculty in each field for further advanced interdisciplinary research that can be pursued at Cornell during a Cognitive Studies minor. It concludes (end of second term) with individual student presentations in which students initiate a critique of some interdisciplinary research, after consultation with a faculty member of their choice.

Although suitable to entering graduate students, the proseminar is also open to graduate students beyond their first year. Advanced undergraduates with a Cognitive Studies concentration may also be admitted. This is a year-long lecture and discussion course. The year-long commitment is mandatory. An "R" grade is assigned in the fall semester, and an S-U grade only will be assigned in the spring semester.]

COM S 664 Machine Vision
Spring. 4 credits.

COM S 671 Introduction to Automated Reasoning
Fall. 4 credits.

COM S 672 Advanced Artificial Intelligence
Spring. 4 credits. Prerequisite: COM S 472.

COM S 674 Natural Language Processing
Spring. 4 credits. Prerequisite: COM S 472.

[COM S 676 Reasoning about Knowledge
Fall. 4 credits. Prerequisites: mathematical maturity and an acquaintance with propositional logic. Not offered 2001–2002. J. Y. Halpern.]

[COM S 677 Reasoning about Uncertainty
Fall. 4 credits. Prerequisites: mathematical maturity and an acquaintance with propositional logic. Not offered 2001–2002. J. Y. Halpern.]

COM S 772 Seminar in Artificial Intelligence
Fall and spring. 2 credits. B. Selman.

COM S 775 Seminar in Natural Language Understanding
Fall and spring. 2 credits.

EDUC 611 Educational Psychology
Fall. 3 credits. Undergraduates admitted with permission from instructor. R. Ripple.

EDUC 614 Gender, Context, and Epistemological Development (also WOMNS 624)
Fall. 3 credits. D. Schrader.

EDUC 714 Moral Development and Education
Spring. 3 credits. D. Schrader.

HD 600/700 Graduate Seminars

LING 530 Representation of Structure in Vision and Language (also COGST 530 and PSYCH 530)
Spring. 4 credits. S. Edelman.

LING 531 Topics in Cognitive Studies (also COST 531 and PSYCH 531)
Spring. 4 credits. Cognitive Studies Program staff.

LING 609 Second Language Acquisition and the Asian Languages (also ASIAN 610)
Fall. 4 credits. Prerequisite: LING 414–415. Y. Shirai.

LING 633 Language Acquisition Seminar (also COGST 633)
Fall. 4 credits. Prerequisite: COGST/HD/LING/PSYCH 436 or equivalent. B. Lust.

LING 700 Graduate Seminars

MATH 681 Logic
Spring. 4 credits.

MATH 781–782 Seminar in Logic
Fall and spring. 4 credits each.

MATH 788 Topics in Applied Logic
Fall. 4 credits.

NBA 663 Managerial Decision Making
Fall. 3 credits. J. Russo.

PHIL 633 Philosophy of Language—Propositions and Events
Spring. 4 credits.

PHIL 662 Philosophy of Mind
Fall. 4 credits. Z. Szabó.

PHIL 700 Graduate Seminars

PSYCH 501 Cognition (also COGST 501)
Fall. 4 credits. Concurrent or prior registration in COGST 101/COM S 101/LING 170/PHIL 191/PSYCH 102, Introduction to Cognitive Science, is required. Co-meets with PSYCH 614, Issues in Cognitive Psychology. S. Edelman.

PSYCH 521 Psychobiology (Developmental Seminar)
Fall and spring. 4 credits each. B. Finlay.

PSYCH 530 Representation of Structure in Vision and Language (also COGST 530 and LING 530)
Spring. 4 credits. S. Edelman.

PSYCH 531 Topics in Cognitive Studies (also COGST and LING 531)
Spring. 4 credits. Cognitive Studies Program staff.

PSYCH 550 Special Topics in Cognitive Science
Spring. 4 credits. M. Spivey.

[PSYCH 601 Computational Models of Language
Spring. 4 credits. Prerequisite: consent of instructor. Not offered 2001–2002. M. Spivey.]

PSYCH 614 Issues in Cognitive Psychology (also COGST 214 and PSYCH 214)
Fall. 4 credits. Co-meets with COGST/PSYCH 501, Cognition. S. Edelman.

PSYCH 616 Modeling Perception and Cognition (also COGST 416 and PSYCH 416)
Spring. 4 credits. M. Spivey.

PSYCH 618 Psychology of Music (also PSYCH 418)
Spring. 4 credits. C. Krumhansl.

[PSYCH 631 Effects of Aging on Sensory and Perceptual Systems (also BIONB 421 and PSYCH 431)
Fall. 3 or 4 credits. Not offered 2001–2002. B. Halpern.]

PSYCH 691 Research Methods in Psychology (also PSYCH 491)
Spring. 4 credits. D. Dunning.

PSYCH 714 Comparative Cognition (also COGST 414 and PSYCH 414)
Spring. 3 credits. M. Owren.

PSYCH 716 Auditory Perception (also PSYCH 316)
Fall. 4 credits. C. Krumhansl.

College Scholar Program

L. Abel, director, 172 Goldwin Smith Hall, 255–3386.

K. Gabard, director, 55 Goldwin Hall, 255–5792.

The College Scholar Program is described in the introductory section of Arts and Sciences.

COLLS 397 Independent Study
Fall or spring. 1–4 credits. Prerequisite: permission of program office.

COLLS 499 Honors Research
Fall or spring. 1–8 credits; a maximum of 8 credits may be earned for honors research. Prerequisite: permission of program director. Each participant must submit a brief proposal approved by the honors committee.

East Asia Program

140 Uris Hall

J. Whitman, director; D. Boucher, K. W. Brazell, M. Brinton, R. Bullock, A. Carlson, P. Chi, S. G. Cochran, B. de Bary, G. Fields, E. M. Gunn, T. Huhn, S. Hoare, P. J. Katzenstein, J. V. Koschmann, F. Kotas, J. M. Law, L. C. Lee, T. P. Lyons, R. McNeal, V. Nee, A. Pan, C. A. Peterson, J. R. Piggott, N. Sakai, P. S. Sangren, M. Shin, Y. Shirai, V. B. Shue, J. J. Suh, R. J. Sukle, K. W. Taylor, H. Wan, D. X. Warner, Emeritus: R. Barker, K. Biggerstaff, E. H. Jorden, J. McCoy, T. L. Mei, R. J. Smith, M. W. Young

The East Asian Program draws together faculty from departments and fields throughout the university who participate in a program of research and teaching on the civilizations and cultures of East Asia. Courses are offered through departments in the humanities and social sciences, as well as in the fields of business, city and regional planning, international and comparative labor relations, and rural sociology. The Department of Asian Studies offers language courses in Mandarin, Cantonese, Korean, and Japanese, in addition to the Full-year Asian Language Concentration (FALCON) in Japanese and Mandarin. Undergraduates major in the Department of Asian Studies and concentrate on the language and culture of one East Asian country, while graduate students may work toward an M.A. in East Asian studies, a dual M.B.A./M.A. degree or an M.A./Ph.D. Degree in a discipline such as agricultural economics, anthropology, city and regional planning, government, history, history of art, linguistics, literature, rural sociology, or sociology. Graduate students concentrating on East Asia may apply for a variety of fellowships and travel grants offered by the East Asia Program. The formal program of study is enriched by numerous events and extracurricular activities, including films, workshops, art exhibits, lectures, symposia, and cultural and artistic performances on East Asia. With a half million holdings in Chinese, Japanese, Korean, and western languages, the Wason Collection in Kroch Library is a major national resource for research on East Asia. A 5,000 piece collection representing the full range of Chinese, Japanese, and Korean art may be seen at the George and Mary Rockwell Galleries in the Herbert F. Johnson Museum of Art.

First-Year Writing Seminars

For information about the requirements for first-year writing seminars and descriptions of seminar offerings, see the John S. Knight Institute for Writing in the Disciplines section, and consult the John S. Knight Institute brochure, available from college registrars in August for the fall term and on the web in late October for the spring term.

Human Biology Program

J. Haas (nutritional sciences), director, 127 Savage Hall, 255–8001; B. Finlay (psychology), J. Fortune (physiology/women's studies), E. Frongillo (nutritional sciences), R. Johnston (psychology), K. A. R. Kennedy (ecology and systematics/anthropology), D. Levitsky (nutritional sciences), P. W. Nathanielsz (physiology), D. L. Pelletier (nutritional sciences), W. Provine (ecology and systematics/history), R. Robertshaw (physiology), S. Robertson (human development), R. Savin-Williams (human development), M. Small (anthropology)

Human biology integrates the methods and theories of many disciplines, such as biological anthropology, nutrition, neurobiology, physiology, psychology, demography, ecology, genetics, and paleontology into a comprehensive study of biological diversity in *Homo sapiens*. A central focus of this interdisciplinary approach to the study of the human organism is an understanding of evolutionary processes that explain our biological variation through space and time. The curriculum of study seeks to educate future biological scientists to address the concerns of a society that is becoming more demanding of the scientific community to place its specialized biological knowledge in a broad context. The human biology curriculum is of particular relevance to undergraduate students in premedical and predentistry programs, biological anthropology, nutrition, human development, ecology and evolutionary biology, psychology, physiology, genetics, and the health-related sciences. It serves to bring together students with a common interest in humankind as defined from these diverse fields and to provide a forum for student-faculty interaction on various topics relating to human evolution and biological diversity. Human biology is not a major but a curriculum of study that provides majors in various departments with a program for selecting elective courses that deal with the biology of the human species. Students in their junior year may develop a program of study in human biology while majoring in a number of different departmental fields.

Basic Requirements

The requirements for a program of study in human biology are designed to ensure sufficient background in physical sciences and mathematics to enable the student to pursue a wide range of interests in the fields of modern biological sciences, anthropology, and fields related to the evolution and physical diversity of the human species. Adjustments may be made in these requirements, depending on the student's academic background and affiliation with colleges and schools within the university.

The basic requirements are one year of introductory biology (BIO S 101–103 plus 102–104 or 105–106 or BIO S 107–108 offered during the eight-week Cornell Summer Session); one year of general chemistry (CHEM 207–208 or 215–216); one year of college mathematics (MATH 111–112 or 105–106 or 111–105); one course in genetics (BIO S 281 or 282); one course in biochemistry (BIO S 330, 331, 332, or 333 or NS 320). It is recommended that students planning graduate study in biological anthropology, psychology, and related fields in the medical and nutritional sciences take a course in statistics. Students should consult their faculty adviser in human biology for help in selecting appropriate courses.

Elective courses should be taken that will enable the student to acquire breadth in the subject matter of human biology outside of their departmental major. Therefore only 6 of the 15 human biology elective credits may also fulfill requirements for the major. Courses should be selected that also provide sufficient exposure to the integration of basic anatomical and physiological sciences with the behavior of individuals and groups within the context of evolutionary theory and ecology. The courses listed below are representative of the offerings in human biology and are included to assist the student in organizing a curriculum of study. They are organized into three groups that reflect the three levels of integration noted above: (1) human anatomy and physiology, (2) human behavior, and (3) human evolution and ecology. Students should choose at least one course from each of these areas of integration. It is anticipated that the student will include in a program of study at least one of the laboratory courses offered. It is expected that a student will take a minimum of 15 credits from among these courses.

There is no foreign language requirement for human biology beyond what is dictated by specific departments and colleges. The requirements for the human biology curriculum are set alongside requirements of the undergraduate majors as these are defined by different departments. Students with independent majors may design their own programs of study under the guidelines provided by their college. Although a student may indicate an interest in human biology in the freshman year and be able to obtain early guidance from a faculty adviser representing the curriculum of study, it is more usual for students to establish their course programs in the first semester of the junior year. The student may request one of the faculty advisers in his or her department who is listed as faculty in human biology to be their principal adviser, or he or she may have an adviser in the department of the major and seek the advice of a human biology faculty adviser in matters pertaining to satisfaction of the requirements. In certain cases a faculty adviser may represent both the major and the curriculum of study in human biology.

Courses

Human Anatomy and Physiology

BIO AP 214 Biological Basis of Sex Differences (also B&SOC 214 and WOMNS 214)
Fall. 3 credits.

BIO AP 311 Introductory Animal Physiology, Lectures (also VET BMS 346)
Fall. 4 credits.

BIO AP 319 Animal Physiology Experimentation
Fall. 4 credits.

BIO AP 458 Mammalian Physiology
Spring. 3 credits.

BIO EE 274 The Vertebrates: Structure, Function, and Evolution
Spring. 4 credits.

BIO EE 474 Laboratory and Field Methods in Human Biology (also ANTHR 474)
Spring. 5 credits.

NS 115 Nutrition and Health: Concepts and Controversies
Fall. 3 credits.

NS 222 Maternal and Child Nutrition
Spring. 3 credits.

NS 315 Obesity and the Regulation of Body Weight
Fall. 3 credits.

NS 331 Physiological and Biochemical Bases of Human Nutrition
Spring. 4 credits.

NS 341 Human Anatomy and Physiology Lab
Spring. 4 credits.

NS 361 Biology of Normal and Abnormal Behavior (also PSYCH 361)
Fall. 3 credits.

NS 441 Nutrition and Disease
Fall. 4 credits.

PSYCH 322 Hormones and Behavior (also BIONB 322)
Spring. 3 or 4 credits.

PSYCH 425 Cognitive Neuroscience
Fall. 3 or 4 credits.

VETMI 431 Medical Parasitology
Fall. 2 credits.

Human Behavior

ANTHR 390 Primate Behavior and Ecology
Spring. 4 credits.

ANTHR 490 Primates and Evolution
Spring. 4 credits.

B&SOC 301 Biology and Society I: The Social Construction of Life (also S&TS 401)
Fall. 4 credits.

BIO NB 421 Effects of Aging on Sensory and Perceptual Systems (also PSYCH 431 and 631)
Fall. 3 or 4 credits.

BIO NB 427 Animal Social Behavior
Fall. 4 credits.

HD 344 Infant Behavior and Development
Fall. 3 credits.

PAM 380 Human Sexuality
Spring. 3 credits.

NS 245 Social Science Perspectives of Food and Nutrition
Fall. 3 credits.

NS 347 Human Growth and Development: Biological and Behavioral Interactions (also HD 347 and B&SOC 347)
Spring. 3 credits.

NS 361 Biology of Normal and Abnormal Behavior
Fall. 3 credits.

PSYCH 326 Evolution of Human Behavior
Fall. 4 credits.

PSYCH 425 Cognitive Neuroscience
Fall. 3 or 4 credits.

R SOC 408 Human Fertility in Developing Nations
Spring. 3 credits.

R SOC 438 Social Demography
Fall. 3 credits.

Human Evolution and Ecology

ANTHR 101 Introduction to Anthropology: Biological Perspectives on the Evolution of Humankind
Fall. 3 credits.

ANTHR 203 Early People: The Archaeological and Fossil Record (also ARKEO 203)
Spring. 3 credits.

ANTHR 390 Primate Behavior and Ecology
Spring. 4 credits.

ANTHR 391 The Evolution of the Human Life Cycle
Spring. 3 credits.

ANTHR 490 Primates and Evolution
Spring. 4 credits.

BIO EE 261 Ecology and the Environment
Fall or summer. 4 credits.

BIO EE 272 Functional Ecology of Vertebrates
Spring. 4 credits.

BIO EE 275 Human Biology and Evolution (also ANTHR 275 and NS 275)
Fall. 3 credits.

BIO EE 278 Evolutionary Biology
Fall or spring. 3 or 4 credits.

BIO EE 371 Human Paleontology (also ANTHR 371)
Fall. 4 credits.

BIO EE 461 Population and Evolutionary Ecology
Spring. 4 credits.

BIO EE 464 Macroevolution
Spring. 4 credits.

BIO EE 471 Mammalogy
Fall. 4 credits.

BIO EE 673 Human Evolution: Concepts, History, and Theory (also ANTHR 673)
Fall. 3 credits.

BIO G 207 Evolution (also HIST 287, and S&TS 287)
Fall or summer. 3 credits.

BIO GD 481 Population Genetics
Fall. 4 credits.

BIO GD 482 Human Genetics and Society
Fall. 3 credits.

BIO GD 484 Molecular Evolution
Spring. 3 credits.

B&SOC 447 Seminar in the History of Biology (also HIST 415)
Fall. 4 credits.

NS 306 Nutritional Problems of Developing Nations
Fall. 3 credits.

NS 451 Epidemiology and Health of Human Communities
Fall. 3 credits.

PAM 303 Ecology and Epidemiology of Health
Spring. 3 credits.

PSYCH 326 Evolution of Human Behavior
Fall. 4 credits.

R SOC 201 Population Dynamics
Spring. 3 credits.

VET MI 431 Medical Parasitology
Fall. 2 credits.

VET PMP 664 Introduction to Epidemiology (enroll in VET CS 664)
Fall. 3 credits.

Independent Major Program

L. Abel, director, 172 Goldwin Smith Hall, 255–3386.

The Independent Major Program is described in the introductory section of Arts and Sciences.

IM 351 Independent Study
Fall or spring. 1–4 credits. Prerequisite: permission of the program office.

IM 499 Honors Research
Fall or spring. 1–8 credits; a maximum of 8 credits may be earned for honors research. Prerequisite: permission of program director. Each participant must submit a brief proposal approved by the honors committee.

International Relations Concentration

Office: 156 Uris Hall, 254-5004, www.einaudi.cornell.edu/about/irc.asp

Faculty Advisory Board T. Bestor (Anthropology); M. Cook (ILR); Matthew Evangelista (Government); S.Feldman (Rural Sociology); D. Lee (ARME); D. Lelyveld (Executive Director, Einaudi Center for International Studies); J. Reppy (S & TS); H. Shue (Ethics and Public Policy); B. Strauss (History); B. Szekely (Associate Director, Cornell Abroad)

Objective

The International Relations Concentration is an interdisciplinary program for undergraduate students enrolled in any of the seven Cornell undergraduate colleges. The International Relations Concentration provides a structured yet flexible program for undergraduates to take advantage of the vast resources available at the university for studying the politics, economics, history, languages, and cultures of the countries and regions of the world.

Graduates of the program have gone on to pursue further education in fields such as political science and anthropology and to successful careers in international law, economics, agriculture, trade, finance, and government service, among others. They have gone on to work in international and nongovernmental organizations, in cross-cultural affairs, in journalism, and in education.

The International Relations Concentration is not a major or a department, but rather a program offering a selection of courses reaching across colleges and departments. Students pursue the International Relations Concentration in addition to their regular degree. International Relations Concentrators have majored in fields ranging from anthropology, city and regional planning, communications, government, and history to natural resources, industrial and labor relations, and computer science. International coursework and language study add a global and cross-cultural dimension to those majors. Some students even design an independent major in some aspect of international relations or comparative social or cultural studies. Spending a semester or year of study abroad can contribute to meeting the course requirements of the IR Concentration, including the language requirement.

Course Requirements

These requirements are designed to expose students to a broad range of perspectives in international relations while allowing them to tailor their course selections to specific interests. Courses throughout the university are grouped into four subject areas including:

1) International Economics and Development;
2) World Politics and Foreign Policy;
3) Transnational Processes and Policies;
4) Cultural Studies.

Within these four subject areas, courses are also identified as "core" or "elective". Starting with the Class of 2003 and for current students who have not been enrolled in the program by the end of spring 1999, students must complete altogether eight courses from the four groups according to one of two strategies. Option A emphasizes the politics and economics of international relations. Option B puts greater stress on culture. In choosing either option, students should ensure that they acquire familiarity with more than one geographic region or country. All courses used to fulfill the concentration requirements must be taken for a letter grade. Courses can count both toward a major and the International Relations Concentration.

Option A:—One core course from Groups 1, 2, 3, and 4—One elective from Groups 1, 2, 3, and 4

Option B:—One core course from Groups 1, 2, 3, and 4—One elective from either Group 1 or Group 2—One elective from Group 3 and 4, and one additional elective from either Group 3 and Group 4

Prior to pre-registration a course list for the following semester (as well as lists for the current and previous semesters) can be obtained from the administrative coordinator, Hyeok Yong Kwon, hyk1@cornell.edu, 156 Uris Hall, as well as from the website. Students should take note that these lists are not necessarily complete. Other courses throughout the university can qualify for the International Relations Concentration by arrangement.

Course List for Fall 2001

(For course list for spring 2002, contact IRC program in fall of 2001. Courses with the brackets are core courses for each group but not offered in fall 2001.)

Group 1: International Economics and Development

Core:

ECON 361	International Trade Theory (prerequisites: ECON 101, 102, 313)
[AEM 230/ ECON 230	International Trade and Finance (ECON 101 required; ECON 102 recommended and may be taken concurrently)]
[ECON 263/ AEM 430	International Trade Policy (ECON 101, 102, 314 required)]

Electives:

AEM 432	Markets or Governments?
AEM 433/ CRP 412	Development, Privatization and New Public Management
CRP 474	Third World Urbanization
CRP 477	Issues in African Development
ECON 371	Economic Development
ECON 425	Economic History of Latin America
ECON 450/ AEM 450	Resource Economics
ECON 471	Economy of the Former USSR and Central Europe
ECON 472	Comparative Economic System: East and West
ECON 475	Economic Problems of India
GOVT 400	America and the World Economy
GOVT 433	Politics of Economic Liberalization in the Developing World
ILRHR 360	Human Resource Economics and Public Policy
GOVT 330/ ILRIC 333/533	Europe, the US, and Japan in the Global Economy

Group 2: World Politics and Foreign Policy

Core:

GOVT 181	Introduction to International Relations

Electives:

AS&RC 311	Government and Politics in Africa
AS&RC 451	Political and Social Change in Caribbean

GOVT 326	Crafting Democratic Constitutional Choices
GOVT 332	Modern European Politics
GOVT 343	Politics of European Union
GOVT 347	Government and Politics of China
GOVT 384	Contemporary International Conflict
GOVT 390	International Relations and Film Theory
GOVT 391	Chinese Foreign Policy
GOVT 490	International Institutions
HIST 214/ AM ST 214	American Foreign Policy
HIST 284	Southeast Asia and the World System
HIST 289	The US-Vietnam War
HIST 290	20th Century Russia and Soviet Union
HIST 295	Colonial Latin America
HIST 371	WWII in Europe
HIST 414	Motivations of US Foreign Policy (permission of the instructor, limited to 15 students)
HIST 467	Modern European History (Topic: International Humanitarian Movements in the 20th Century: limited to 12 students)

Group 3: Transnational Processes and Policies

Core:

GOVT 294/ PHIL 294	Global Thinking
GOVT 393	Introduction to Peace Studies

Electives:

ANTHR 422	Anthropology and the Environment (limited to 15 students)
ANTHR 480	Anthropology and Globalization
AEM 494	Ethical Issues in Food and Agriculture
B&SOC 461	Environmental Policy
CRP 380	Environmental Politics
CRP 451	Environmental Law
CRP 453	Environmental Aspects of International Planning (open to advanced undergraduates) COMM 424 Communication in the Developing Nations (open to juniors and seniors)
GOVT 343	Politics of European Integration
HIST 250/ ECE 250/ S&TS 250	Technology in Society
HIST 467	Modern European History (Topic: International Humanitarian Movements in the 20th Century: limited to 12 students)
ILRHR 469	Immigration and the American Labor Force
INTAG 300	Perspectives in International Agricultural and Rural Development
INTAG 402	Agriculture in Developing Nations I (open to upper class undergraduates)
PAM 383	Social Welfare as Social Institute
R SOC 261	Sociology of Sustainable Development
R SOC 325/ AIS 325	Indigenous Globalization
SOC 437/ R SOC 438	Social Demography
S & TS 411	Knowledge, Technology, and Property

Group 4: Cultural Studies

Core:

ANTHR 200	Cultural Diversity and Contemporary Issues
[ANTHR 102	Introduction to Anthropology: The Comparison of Cultures]

Electives:

ANTHR 224	The French Experience
ANTHR 230/ AIS 230	Cultures of North America
ANTHR 336	Change and Continuity in Pacific
ANTHR 345	Japanese Society
ANTHR 362	Democratizing Society
ANTHR 381	Anthropology and Religion
ANTHR 422	Anthropology and the Environment (limited to 15 students)
ARKEO 360/ NES 360/ JWST 360	Origins of Mesopotamian Civilization
ART H 220/ CLASS 220	Introduction to Art History: Classical World
ART H 280	Approaches to Asian Art
ART H 362/ WOMNS 361	Impressionism in Society
ART H 378/ AS&RC 310	Art in African Culture and Society
ART H 478/ AS&RC 435	African Cinema
AS&RS 404	Afrocentricity
ASIAN 211	Introduction to Japan
ASIAN 215	Introduction to South Asian Civilization
ASIAN 312	Intellectuals: Early Modern Korea
ASIAN 351/ RELST 351	Indian Religious World
ASIAN 415/ COM L 418	Virtual Orientalism
COM L 330/ GERST 330/ THETR 329	Political Theory and Cinema
COM L 334/ NES 339/ RELST 334	Islamic Spain: Culture and Society
COM L 404/ ENGL 404	Nazis and the Literary Imagination
COM L 474/ HIST 474	Topics in Modern European Intellectual and Cultural History
ENGL 251/ WOMNS 251	20th Century Women Novelists
FRLIT 320	French Civilization II
FRLIT 370	Perspectives on Enlightenment
FRLIT 386	Perfume, Jewerly, Cigarretts
HIST 151	Introduction to Western Civilization
HIST 191	Introduction to Modern Asian History
HIST 206	Modern Mexico
HIST 213/ AAS 213	Asian American History
HIST 224	Art and Politics—20th Century Latin American History
HIST 253/ NES 255/ RELST 255	Introduction to Islamic Civilization
HIST 263/ RELST 263	The Earlier Middle Ages
HIST 265/ CLASS 265	Ancient Greece From Homer-Alexander
HIST 281	Science in History
HIST 284/ ASIAN 284	South East Asia and the World System
HIST 291	Modern Jewish History, 1789-1948
HIST 295	Colonial Latin America
HIST 297	Japan before 1600
HIST 310/ ENGL 314	Life, Literature, Power: Late Medieval England
HIST 349	Early Modern England
HIST 355	The Old Regime: France in the 17th and 18th Century
HIST 360	Early Warfare: East and West
HIST 395	South East Asia to the 18th Century
HIST 404/ S HUM 401	The Soul in Medieval Culture
HIST 405/ S HUM 408/ GERST 420	Jewish Culture and Modernity
HIST 435/ CLASS 445	Modern Classic History of Ancient Greece (limited to 15 students)
HIST 447	Crusaders and Chroniclers (limited to 15 students)
HIST 451/ ASIAN 450	Crime and Diaspora in South East Asian History (limited to 15 students)
HIST 474/ COM L 474/ JWST 474	Topics in Modern European Intellectuals and History (limited to 15 students)
HIST 477	Politics of Enlightenment
HIST 490	Tales of the Heike
HIST 492	Medieval Chinese History
HIST 493/ ASIAN 493	Problems in Modern Chinese History
ITALL 224	Contemporary Italy
ITALL 390	Fascist Bodies, Fascist Films

SOC 429	Culture and Agency
S&TS 287/ BIO G 207/ HIST 287	Evolution
SPANL 346	Hispanic Caribbean Culture and Literature
THETR 240	Introduction to World Theatre I
THETR 274	Introduction to Film Analysis

Language Requirement

IR Concentrators are expected to complete additional language study beyond the College of Arts and Sciences degree requirement. This study can be accomplished in one of two ways: 1) two years of one foreign language (proficiency plus one course) 2) two languages at proficiency.

Study Abroad

IR Concentrators are strongly encouraged to study abroad to bring a practical dimension to their expertise in international issues. Those who choose this option will find the requirements for the concentration highly compatible with courses taken abroad. Students are encouraged to contact the Administrative Coordinator prior to departure.

Completion

Transcripts will reflect successful completion of the requirements for the concentration. In addition, students will receive a special certificate and a letter of confirmation signed by the director of the international relations concentration.

Enrollment

To obtain course lists, to enroll and for all further information, please contact: *Administrative Coordinator: Hyeok Yong Kwon, the Mario Einaudi Center for International Studies, 156 Uris Hall, hyk1@cornell.edu, Tel: 254–5004.

Center for International Studies

See Interdisciplinary Centers, Programs, and Studies.

Program of Jewish Studies

D. I. Owen, director (Ancient Near Eastern and Biblical History and Archaeology), L. Adelson (German-Jewish Literature and Culture), G. Altschuler (American-Jewish History and Culture), D. Bathrick (Holocaust Film Studies), R. Brann (Judeo-Arabic Studies), V. Caron (Modern French and European-Jewish History), M. Diesing (Yiddish Language and Linguistics), N. Furman (French Holocaust Literature), K. Haines-Eitzen (New Testament and Early Christianity), R. Hoffmann (Holocaust Studies), P. Hyams (Medieval Jewish History), D. LaCapra (Holocaust Studies), M. Migiel (Italian Literature), R. Polenberg (American-Jewish History), J. Porte (American-Jewish Writers), D. S. Powers (Arabic and Islamic Studies), G. Rendsburg (Biblical and Semitic Studies), E. Rosenberg (Holocaust Studies), N. Scharf (Hebrew Language), D. Schwarz (Anglo-Jewish Literature), G. Shapiro (Russian-Jewish Literature), S. Shoer (Hebrew Language), D. Starr (Modern Hebrew and Arabic Literature), M. Steinberg (German-Jewish History and Culture), Y. Szekely (Judaica Bibliography), S. Toorawa (Minorities in Islamic Hands), J. Zorn (Biblical Archaeology)

The Program of Jewish Studies was founded as an extension of the Department of Semitic Languages and Literatures, now the Department of Near Eastern Studies, in 1973 and attained status as an intercollegiate program in 1976.

The program has grown out of the conviction that Judaic civilization merits its own comprehensive and thorough treatment and that proper understanding of any culture is inconceivable without adequate knowledge of the language, literature, and history of the people that created it. Accordingly, the offerings in the areas of Jewish languages and literatures have been considerably expanded, and courses in ancient, medieval, and especially modern Jewish history and culture have been added to the program.

It is a broadly based, interdisciplinary program, bringing together faculty from various Cornell departments and colleges.

The Program of Jewish Studies supports teaching and research in the many areas of Jewish Studies. It is a secular, academic program, whose interests are diverse and cross-cultural. The program recognizes its special relationship to teaching and research in classical Judaica and Hebraica pursued by the members of the Department of Near Eastern Studies, with particular emphasis on the interrelationship between Judaism, Christianity, and Islam.

It presently enables students to obtain basic instruction and specialization in the fields of Semitic languages; the Hebrew Bible; medieval and modern Hebrew literature; ancient, medieval, and modern European and Middle Eastern Jewish history; and Holocaust studies. In some of these fields students may take courses on both graduate and undergraduate levels. Faculty throughout the university provide breadth to the program by offering courses in related areas of study.

Courses Offered

JWST 105–106 Elementary Modern Hebrew I and II (also NES 101–102)
105 fall; 106 spring. 6 credits. S. Shoer.
For description, see NES 101–102.

JWST 163 Things the Prophets Never Told You: Archaeology and the Religion of Ancient Israel (also NES 163)
Fall. 3 credits. J. Zorn.
For description, see NES 163.

JWST 201–202 Intermediate Modern Hebrew I and II (also NES 201–202)
201, fall; 202@, spring. 4 credits. N. Scharf.
For description, see NES 201–202.

JWST 235 Jews and Arabs in Conflict: The Modern Period (also NES 235)
Spring. 3 credits. D. Starr.
For description, see NES 235.

JWST 239 Cultural History of the Jews of Spain (also NES 239, COM L 239, RELST 239, SPAN L 239)
Spring. 3 credits. M. Segol.
For description, see NES 239.

JWST 246 Jewish Mysticism (also RELST 246, NES 246)
Fall. 3 credits. M. Segol.
For description, see NES 246.

JWST 252 Modern European Jewish History, 1789–1948 (also HIST 291)
Fall. 4 credits. V. Caron.
For description, see HIST 291.

JWST 254 Anti-Semitism and the Crisis of Modernity: From the Enlightenment to the Holocaust (also HIST 235)
Spring. 4 credits. V. Caron.
For description, see HIST 235.

JWST 256 Introduction to the Q'uran (also RELST 256, NES 256)
Spring. 3 credits. S. Toorawa.
For description, see NES 256.

JWST 257 Ethics of Imagining Holocaust (also GERST 221, ENGL 221)
Fall. 4 credits. D. Schwartz.
For description, see ENGL 221.

JWST 263 Introduction to Biblical History and Archeology (also RELST 264, ARKEO 263, and NES 263)
Spring. 3 credits. J. Zorn.
For description, see NES 263.

JWST 268 Ancient Egyptian Civilization (also NES 268, ARKEO 268)
Spring. 3 credits. G. Kadish.
For description, see NES 268.

JWST 294 Imagining the Modern Middle East (also NES 294, HIST 288, GOVT 358)
Fall. 4 credits. S. Alatout.
For description, see NES 294.

JWST 301–302 Advanced Modern Hebrew I and II (also NES 301–302)
301, fall; 302, spring. 4 credits. N. Scharf.
For description, see NES 301–302.

JWST 339 Islamic Spain: Culture and Society (also RELST 334, SPANL 339, COM L 334, NES 339)
Fall. 4 credits. R. Brann.
For description, see NES 339.

JWST 360 Origins of Mesopotamian Civilization (also NES 360, ARKEO 360)
Fall. 4 credits. D. I. Owen.
For description, see NES 360.

JWST 361 Sumerian Language and Culture (also NES 361, ARKEO 361)
Spring. 4 credits. D. I. Owen.
For description, see NES 361.

JWST 394 Gender, Sexuality, and the Body in Early Christianity (also NES 394, WOMNS 394, RELST 394)
Spring. 3 credits. K. Haines-Eitzen.
For description, see NES 394.

JWST 400 Seminar in Advanced Hebrew (also NES 400)
Fall. 4 credits. Enrollment limited to 15 students. N. Scharf.
For description, see NES 400.

JWST 401 Topics in Modern Hebrew Literature (also JWST 401)
Spring. 4 credits. D. Starr.
For description, see NES 401.

JWST 408 Jewish Culture and Modernity (also S HUM 408)
Fall. 4 credits. M. Steinberg.
For description, see S HUM 408.

JWST 409 Season of Migration (also SOC H 409, RELST 409)
Fall. 4 credits. S. Toorawa.
For description, see SOC H 409.

JWST 414 History into Fiction: Nazis and the Literary Imagination (also ENGL 404, COM L 404, GERST 414)
Fall. 4 credits. E. Rosenberg.
For description, see ENGL 404.

JWST 420 Readings in the Hebrew Bible (also NES 420, RELST 420)
Fall. 4 credits. R. Brann.
For description, see NES 420.

JWST 446 History of Jews in Modern France (also HIST 417, FR LIT 413)
Fall. 4 credits. V. Caron.
For description, see HIST 417.

JWST 458 Imagining the Holocaust (also JWST 658, ENGL 458/658, GERST 457/657)
Spring. 4 credits. D. Schwarz.
For description, see ENGL 458.

JWST 474 Topics in Modern Europe: Intellectual and Cultural History (also HIST 474, COM L 474)
Fall. 4 credits. D. LaCapra.
For description, see HIST 474.

JWST 491–492 Independent Study—Undergraduate
Fall and spring. Variable credit. Staff.

JWST 499 Independent Study—Honors
Fall and spring. Variable credit. Staff.

JWST 658 Imagining the Holocaust (also JWST 458, ENGL 458/658)
Spring. 4 credits. D. Schwarz.
For description, see ENGL 458/658.

Courses Not offered 2001–2002.

JWST 197 Introduction to the Near Eastern Civilization (also NES 197 and RELST 197)

JWST 123–124 Elementary Biblical Hebrew I & II (also NES 123–124, RELST 123–124)

JWST 223 Introduction to the Bible (also NES 223 and RELST 223)

JWST 224 Introduction to the Bible II (also NES 224, RELST 224)

JWST 227 Introduction to the Prophets (also NES 227 and RELST 227)

JWST 229 Introduction to the New Testament (also NES 229, RELST 229)

JWST 236 Israel: Literature and Society (also NES 236)

JWST 244 Introduction to Ancient Judaism (also NES 244, RELST 244)

JWST 248 Introduction to Classical Jewish History (also RELST 248 and NES 248)

JWST 251 Judaism, Christianity and Islam (also NES 251, RELST 251)

JWST 253 From Medievalism to Modernity: The History of Jews in Early Modern Europe, 1492–1789 (also NES 245, HIST 285)

JWST 255 Women and the Holocaust (also ENGL 252, WOMNS 252)

JWST 261 Ancient Seafaring (also NES 261, ARKEO 275)

JWST 271 Yiddish Linguistics (also LING 241)

JWST 290 History of Zionism and the Birth of Israel (also NES 290, HIST 267)

JWST 299 The Hebrew Bible and the Arabic Qur'an in Comparative Perspective (also NES 299, RELST 299, COM L 299)

JWST 320 Women in the Hebrew Bible (also NES 320)

JWST 323 Reinventing Biblical Narrative Apocrypha and Pseudepigrapha (also NES 323, RELST 323)

JWST 325 Introduction to the Bible—Seminar (also NES 325, RELST 318)

JWST 326 Women in the Hebrew Bible—Seminar (also NES 326, WOMNS 236)

JWST 328 Gnosticism and Early Christianity (also NES 328, RELST 330)

JWST 329 Introduction to the New Testament—Seminar (also NES 329, RELST 329)

JWST 344 The History of Early Christianity (also NES 324, CLASS 344 and RELST 325)

JWST 346 Seminar in Nineteenth-Century Jewish Intellectual History (also NES 347 and RELST 346)

JWST 347 Gender and Judaism (also WOMNS 347, RELST 343, NES 345)

JWST 352 The Transformation of European Jewry (also HIST 389)

JWST 353 History of the Holocaust (also HIST 370)

JWST 363 Society and Law in the Ancient Near East (also NES 363)

JWST 366 The History and Archaeology of the Ancient Near East (also NES 366, ARKEO 366)

JWST 371 A Mediterranean Society and Its Culture: The Jews under Classical Islam (also NES 371, RELST 371, COM L 371)

JWST 418 Exploring the Israeli Folksong (also S HUM 418, MUSIC 418)

JWST 421 Readings in Biblical Hebrew Poetry (also NES 421, RELST 421)

JWST 428 Medieval Hebrew Biblical Exegesis (also NES 428, NES 624 and RELST 428)

JWST 435 Aramaic (also NES 435)

JWST 442 German Jewish Culture: From the Enlightenment to the Present (also GERST 442 and S HUM 442)

JWST 449 Rescreening the Holocaust (also GERST 449, COM L 453, THETR 450)

JWST 454 Anti-Semitism and the Crisis of Modernity: From the Enlightenment to the Holocaust (also HIST 435)

JWST 474 Topics in Modern European Intellectual and Cultural History (also HIST 474)

JWST 478 Jewish-American Writing (also ENGL 479 and AM ST 479)

JWST 494 Studies in the Novel: Reading Joyce's Ulysses (also ENGL 470)

JWST 623 Encounters with the Dead (also JWST 323, ITALL 323/623, COML 323/623)

JWST 639 Islamic Spain: Culture and Society (also NES 339/639, JWST 339, RELST 334, SPAN L 339/699, COM L 334)

JWST 694 Joyce's Ulysses and the Modern Tradition (also ENGL 670)

John S. Knight Institute for Writing in the Disciplines

The director of the John S. Knight Institute is Jonathan Monroe, associate dean of the College of Arts and Sciences, professor in the Department of Comparative Literature, and George Elliott Reed Professor of Writing and Rhetoric. Katherine Gottschalk, senior lecturer in the Department of English, is the Walter C. Teagle Director of First-Year Writing Seminars. The Institute's offices are in 159 Goldwin Smith Hall, 255–4061.

M. Gilliland (Writing Workshop), K. Hjortshoj (Writing in the Majors), S. Donatelli (Sophomore Writing Seminars), B. LeGendre (Writing Workshop), J. Martin (Writing Workshop), J. Pierpont (Writing Workshop), E. Shapiro, (Writing Workshop).

The John S. Knight Institute helps to coordinate the teaching of writing for undergraduates in six of the university's schools and colleges (the School of Industrial and Labor Relations and the colleges of Agriculture and Life Sciences; Architecture, Art, and Planning; Arts and Sciences; Engineering; and Human Ecology). The program administers writing seminars for first-year and upperclass students, tutorial writing classes, and seminars in the teaching of writing. More than thirty academic departments and programs participate in the program.

First-Year Writing Seminars

For first-year students the Institute offers the first-year writing seminars—more than 125 different courses in the humanities, social sciences, expressive arts, and sciences. Through introductory work in a particular field of study, seminars help students write good English expository prose—prose that, at its best, is characterized by clarity, coherence, intellectual force, and stylistic control. All seminars pursue this common aim through small classes, with a maximum of 17 students, and adherence to a program-wide set of guidelines:

- Seminars require at least six—and at most 12—formal essays on new topics. (While these assignments should total about 30 pages, some of the 30-page total may include major drafts which receive commentary from the instructor and are later significantly revised.) Assignments form a logical sequence.
- At least three of the 6–12 required essays are developed through several stages of revised drafts under the instructor's guidance. Guidance may include, in addition to written commentary on drafts, individual conferences, in-class group work, peer commentary, reading responses, journals, and so on.
- Ample classroom time is spent on work directly related to writing.
- Reading assignments in the course subject are kept under 75 pages per week to permit regular, concentrated work on writing.
- All students meet in at least two individual conferences with the instructor.

Offerings change from semester to semester. Each term's first-year writing seminars are described in a brochure available from college registrars in the fall and on the web in the spring.

To ensure that students will enjoy the benefits of small writing classes, first-year writing seminars are limited to no more than 17 students. Instead of pre-enrolling in their writing courses, students request placement in one of five writing seminars by filling out ballots available from their college registrars in the fall and on the web in the spring. Over 90 percent receive one of their top three choices. Students may change their writing seminars each semester at the First-Year Writing Seminar Exchange. Changes can also be made at special First-Year Writing Seminar add/drop

sessions held during the first two weeks of each semester.

The colleges and the school served by the Institute accept first-year writing seminars in fulfillment of their individual graduation requirements in categories referred to variously as "first-year writing," "oral and written expression," and the like. The Institute does not decide whether students may graduate: it makes courses available. Individual colleges and schools administer their own graduation requirements.

Currently, most undergraduate students are required to take two first-year writing seminars. Architecture majors, however, need only one. Hotel students fulfill their requirement through H ADM 165, which should be taken with H ADM 265 during the first two semesters at Cornell. Agriculture and Life Sciences students can take first-year writing seminars or choose from among a variety of other courses to fulfill their requirement.

All students who score "4" or "5" on the Princeton Advanced Placement Examination in English receive three credits. Such credits are awarded automatically; no application to the John S. Knight Institute or the Department of English is necessary. How these credits may be applied to first-year writing or other distribution requirements depends on the student's college and score. All students who score "5," except Architecture majors, may apply their three credits towards the writing requirements of their college. Of students who score "4," only Agriculture and Life Sciences students and Industrial and Labor Relations students may apply their three credits toward the writing requirements of their college. Students should always consult their college registrars to be certain that they understand their writing requirements.

Students who have already taken a first-year writing seminar, or who score "4" or "5" on the Princeton AP exam, or "700" or better on the English Composition or CEEB tests, may enroll, space permitting, in the following upper-level first-year writing seminars: ENGL 270, 271, or 272.

Although there are no exemptions from college writing requirements, some students may fulfill all or part of their college's writing requirement through transfer credits or writing-course substitutions.

For work done at other institutions to be accepted as equivalent to first-year writing seminars, students should demonstrate that they have done a reasonably equivalent amount of writing in a formal course. (It is not sufficient to write, for example, one 30-page term paper.) Students in the College of Engineering and the College of Arts and Sciences must file an "application for transfer evaluation" to request writing credit for such courses; students in other colleges should consult their college registrars.

In unusual circumstances, upper-level students may petition to use a Cornell writing course other than a first-year writing seminar to satisfy part of their writing requirement. The John S. Knight Institute must approve all such petitions in advance.

For information about the requirements for first-year writing seminars and descriptions of seminar offerings, consult the John S. Knight Institute brochure, available from college registrars in August for the fall term and on the web in late October for the spring term.

English 288–289: Expository Writing

English 288–289, "Expository Writing," helps students write with more confidence and skill in all disciplines. Open to Cornell sophomores, juniors, and seniors, ENGL 288–289 courses explore themes shaped by a genre or use of expository writing, by the common concerns of several disciplines, or by an interdisciplinary topic intimately related to the written medium. Although English department instructors make up roughly half the staff, the Knight Institute's involvement enables the course to extend and diversify its offerings in separately defined, 16-member sections that appeal to the varied interests and needs of students in many areas of study. Students may choose among a variety of sections focusing on such themes as "Minding the Body," "The Essay: Personal to Public," "Issues, Audiences, and Ourselves," "Reading the News, Understanding the Media," and "Myths of the City." All staff are selected because their special interests and their training and experience in First-Year Writing Seminars promise original course design and superior performance.

Sophomore Writing Seminars

In the spring of 2002 the Knight Institute will launch the first set of courses in its Sophomore Seminars initiative, a distinctive new tier of electives sponsored by the Institute that will involve a wide range of disciplines across the Arts College and the University. Building on the introductory exposure to discipline-specific approaches to writing gained by students in their two required First-Year Writing Seminars, Sophomore Seminars will offer students the opportunity to benefit from early mentoring experiences in small, faculty-taught classes that will help them prepare for the more advanced, increasingly specialized work in which they will be engaged in their chosen fields as juniors and seniors. With a limited enrollment of 15 students per class, each Sophomore Seminar is intended to serve as a gateway course to a particular major within an expressly interdisciplinary context. The first five Sophomore Seminars will be offered in spring 2002. Additional seminars will be offered each year, with a total of 30 seminars annually by 2006.

Writing in the Majors

Spanning the humanities, social sciences, and sciences, the Knight Institute's upper-level, Writing in the Majors courses do not satisfy formal writing requirements, and faculty participation is entirely voluntary. While all Writing in the Majors courses include extensive writing, usually with guided revision, they also emphasize other forms of active, interactive learning essential to scholarship and careers in the disciplines. Writing in the Majors initiatives have included individual and collaborative research projects, collaborative writing, oral presentations, group oral exams, field studies, authentic student-designed laboratory experiments, debates, analytical and critical reading exercises, topical symposia, conversation groups, student-led discussions, poster sessions, and many kinds of informal writing, including on-line exchanges. Varying radically in design and size, from enrollments of fewer than 10 students to more than 300, Writing in the Majors courses over the past twelve years have involved collaboration with 100 faculty members and more than 140 graduate teaching assistants to enrich learning in 63 upper-level courses offered in 22 departments.

Teaching Writing

Each summer and fall, the Institute offers instruction in the teaching of writing to new staff members in the first-year writing seminars and other interested instructors. Teaching Writing, offered in the summer or fall, is primarily a course for graduate students. The program also sponsors a summer apprenticeship program for a limited number of graduate students, and a summer seminar for faculty members interested in the teaching of writing.

WRIT 700 Teaching Writing

Summer and fall. 1 credit. S-U grade only. Teaching Writing introduces new instructors of Cornell's First-Year Writing Seminars to the challenges of teaching writing in courses that both introduce students to particular fields of study and develop the sophisticated writing skills students will need throughout their undergraduate careers and beyond. An overview of methodologies involved in the teaching of writing within a disciplinary context is provided by readings representing a range of pedagogical theories and practices, seminar discussions, and presentations of faculty, visiting scholars in the field, and experienced TAs. Participants in the course prepare written assignments designed to prepare them for the actual work of their First-Year Writing Seminars. In addition, written critiques and explanatory rationales of those assignments provide an opportunity for reflection on the methods chosen and on the principles underlying them.

Writing Workshop

The John S. Knight Institute offers "An Introduction to Writing in the University" for first-year students (or transfer students needing writing credit) through the Writing Workshop. This course is designed for students who have had little training in composition or who have serious difficulty with writing assignments.

WRIT 137 and 138 are graded S-U only, and students receiving a grade of S are granted credit toward their college writing requirements. Students who think this course might be appropriate, including non-native speakers of English scoring less than 600 on the Test of English as a Foreign Language (TOEFL), should attend the assessment sessions offered by the Writing Workshop during orientation week each fall. The Workshop also offers a Walk-In Service (see below) to help students work on writing assignments. The director is Joe Martin, senior lecturer in the Writing Workshop. The Workshop offices are in 174 Rockefeller Hall, 255–6349.

The Walk-In Service

Through the Walk-In Service, the Writing Workshop offers tutoring assistance in writing to any student who needs help with a writing project. The Walk-In Service has tutors available during the academic year in 174 Rockefeller and north- and west-campus residential areas. The director is Mary Gilliland. For information contact the Writing Workshop, 174 Rockefeller Hall, 255–6349.

WRIT 137–138, 134 An Introduction to Writing in the University

137, fall; 138, spring; 134, summer. 3 credits each term. Each section limited to 12 students in the fall and spring, 6 students in the summer. S-U grades only. Prerequisite: permission of instructor.

This writing seminar is designed for students who need more focused attention to master the expectations of academic writing. The course emphasizes the analytic and argumentative writing and critical reading essential for university-level work. With small classes and weekly student/teacher conferences, each section is shaped to respond to the needs of students in that particular class.

WRIT 139–239 Special Topics in Writing

Fall, spring. 139, undergraduate students only; 239, graduate students only. 3 credits. S-U grades only. Cannot fulfill any writing or distribution requirements. Prerequisite: permission of instructor.

These courses allow students the opportunity to resolve significant writing challenges that have interfered with their academic progress. Students must have ongoing writing projects on which to work. Instruction is in weekly tutorials. Interested students should come to 174 Rockefeller for more information.

Latin American Studies

190 Uris Hall

B. J. Isbell, director; M. J. Dudley, associate director; L. Benería, R. Blake, D. Block, D. Castillo, C. Castillo-Chávez, M. L. Cook, D. Cruz de Jesus, T. Davis, E. Dozier, B. Deutsch-Lynch, G. Fields, M. A. Garcés, M.C. García, W. Goldsmith, J. Haas, J.-P. Habicht, J. Henderson, Z. Iguina, S. Jackson, T. Jordan, J. Kronik, S. Kyle, D. R. Lee, L. Morató, J. Oliveira, K. O'Neill, J. E. Paz-Soldán, G. Pelto, J. Piedra, A. Power, E. Rodríguez, M. Roldan, J. Routier-Pucci, D. Sanjur, V. Santiago, H. Schamis, R. Sierra, M. Stycos, M. J. Stycos, M. Suñer, D. Thurston, T. Turner, H. Vélez.

The Latin American Studies Program encourages and coordinates faculty and student interests in Latin America. A variety of special lectures, films, and seminars supplement the regular course offerings. Graduate students may pursue a minor in Latin American Studies, while majoring in the field of their choice.

Undergraduate Concentration

Undergraduate students may fulfill a Latin American Studies Concentration by completing a minimum of 15 credits in Latin American Studies courses combined with language proficiency in Quechua, Spanish, or Portuguese. Latin American courses are offered in the College of Agriculture and Life Sciences; the College of Architecture, Art, and Planning; the College of Arts and Sciences; the College of Human Ecology; the School of Hotel Administration; and the School of Industrial and Labor Relations.

For further information and a current course listing, students should contact the program office at 255–3345, or visit 190 Uris Hall.

Latin American Studies Core Courses

It is strongly recommended that undergraduate concentrators take the interdisciplinary core course, SPANL 320/LASP 301 Perspectives on Latin America.

Particular attention is drawn to the following courses that students have taken in the past to complete requirements for the undergraduate concentration or the graduate minor. Other courses may be substituted with the approval of the adviser.

ANTHR

204	Ancient Civilizations
333	Ethnology of the Andean Region
355	Archaeology of Mexico and Central America
382	Latin America: An Anthropological Perspective
433	Andean Ethnology Thought and Culture
456	Mesoamerican Religion, Science, and History
485/685	Mothers, Priests, Rebels and Indian Chiefs: New Social Movements in Latin America
487	Field Research Abroad—Cornell-Honduras Program
499	The Amazonian Imagination: Reflections on the Savage State
637	Social Movements, Human Rights and Democracy in Latin America
638	Contemporary Gender Issues in the Americas
656	Maya History

ARKEO

355	Archaeology of Mexico and Central America

AS&RC

451	Politics and Social Change in the Caribbean
455	Caribbean Literature
530	Womanist Writing Africa and Caribbean

COM L

482	Latin American Woman Writers

CRP

371	Cuba: The Search for Development Alternatives
453	Environmental Aspects of International Planning
395/679	Latin American Cities
616	Globalization and Development
670	Regional Planning and Development in Developing Nations
671	Seminar in International Studies and Planning

ECON

425	Economic History of Latin America
468	Economic Problems of Latin America
748	Issues in Latin American Development

ENGL

243	Poetry & Politics in the Americas
676	Testimonio (Testimonial Narrative) in the Americas

GOVT

340	Latin American Politics
430	Democracy, Power, and Economic Reform: Cross-Regional Perspectives
433	Politics of Economic Liberalization in the Developing World
448	The Quality of Democracy in Latin America
631	Comparative Labor Movements in Latin America
638	Latin American Political Economy

H ADM

455	Ecotourism and Sustainable Development
496	Latin American Hotel Development Seminar

HIST

202	Comparative Migration in the Americas
206	Modern Mexico
216	Gender and Colonization in Latin America
249	Race and Class in Latin American History
295	Colonial Latin America
296	Modern Latin America
323	Mexico: From Empire to Nation
347	Agrarian Societies in Latin American History
348	Contemporary Brazil
418	Agrarian History
423	Chronicles of the Conquest of Latin America
424	Art and Politics in Twentieth-Century Latin America
438	History's Margin: Frontiers and Borders in Comparative Perspective
445/645	Prostitutes and Patriots: The Urban Construction of Citizenship in Latin American History
449	Race and Class in Latin American History
470	Violence, Nation, Myth: The Americas 1790–1940
475	Bandits, Deviants and Rebels

ILR

304	Comparative North American Labor History: Mexico, Canada, and the U.S. in the 20th Century
332	Labor in Developing Economies
339	The Political Economy of Mexico
631	Comparative Labor Movements Latin America
638	Labor, Free Trade, and Economic Integration in the Americas
731	The Transformation of Industrial Relations in Latin America
739	Political Economy of Mexico

INTAG

402	Agriculture in Tropical America
403	Traditional Agriculture in Developing Nations

NBA

590	Business in Latin America

PORT

121–122	Elementary Portuguese
209–219	Intermediate Composition
303–304	Advanced Portuguese Composition and Conversation
319	Readings in Luso-Brazilian Literature

QUECH

121–122	Elementary Quechua
136	Quechua Writing Lab
209–219	Continuing Quechua
300	Independent Quechua (Directed Studies)

S HUM

401	Alternative Modernities: The Latin American City
419	Tourism in Cuba and Puerto Rico

SPANL

218	Introduction to Hispanic Literature
300	Gender and Sexuality in Latin America
301	Hispanic Theater Production
313	Creative Writing Workshop (in Spanish)
315	Renaissance Hispanism: Spain and the Americas
317	Readings in Colonial Spanish-American Literature
318	Readings in Modern Spanish-American Literature
320	Perspectives on Latin America
332	Modern Drama in Spanish America
345	Contemporary Spanish-American Novel
346	Hispanic Caribbean Culture and Literature
347	Spanish America in Black and White
348	Cuban Literature
350	Literature of Conquest
374	Caribbean Popular Culture
376	Studies in the Spanish and Latin American Essay
379	Colonial Spanish American Literature
381	Fin de Siglo
384	Literature and Revolution
390	The Fiction of Manuel Puig
394	Trans-Atlantic Renaissance
395	Modern/Contemporary Andean Literature
398	Post-Revolutionary Mexican Novel
402	Latin American Feminisms
403	After Immigration
450	Literature of Conquest
479	Colonial Spanish-American Literature: Voices of the Colonized
480	Latin American Cultural Theory
483	Macondo/McOndo: Our Fin de Siglo?
487	Borges
492	Latin American Women Writers
494	Maricoteria/Queer Theory
495	Gabriel García Márquez
625	Latin American Literature & Mass Media
639	Special Topics in Latin American Literature
690	Hispanic Feminisms
698	The Latin American "Boom"

SPANR

200	Spanish for English/Spanish Bilinguals
207	Intermediate Spanish for the Medical and Health Professions
209–219	Intermediate Spanish Composition and Conversation I & II
300	Directed Studies. Extra credit for ANTHR 333 and CRP 371
310	Advanced Spanish Conversation and Pronunciation
311–312	Advanced Composition and Conversation I & II
366	Spanish in the United States
407	Applied Linguistics: Spanish
408	The Grammatical Structure of Spanish
630	Spanish for Reading

Latino Studies Program

434 Rockefeller Hall

The Latino Studies Program is an interdisciplinary academic program that focuses on the contributions, concerns, and welfare of those persons of Latino origin who reside in the United States. It includes support for historical, linguistic, literary, social, economic, and political studies of this diverse group of Americans. To this end the program objectives are (1) to expand the available course curriculum by providing both undergraduate and graduate courses pertaining to Latino subject matters; (2) to enlarge the size of the Latino faculty at Cornell through permanent appointments visiting scholars, and post-doctoral fellowships; and (3) to enhance the academic environment on campus through support of such activities as lectures, conferences, seminars, exhibits, and research activities.

Undergraduate Concentration

The Latino Studies Program offers an undergraduate concentration in Latino Studies which consists of an interdisciplinary course of study primarily in history, sociology, anthropology, literature and language. To complete the concentration, students must take at least five courses (minimum total of 15 credits) in Latino Studies, including "Latinos in the United States" (LSP 201/SOC 265) offered each spring semester. Students are required to include at least two courses at the 300 or 400 levels. Students who are interested in the concentration must meet with the LSP adviser, senior lecturer Loretta Carrillo, and file an application with the Latino Studies Program office by the beginning of their junior year. A maximum of one independent study, which requires the approval of the LSP adviser, will be accepted to fulfill the requirements of the concentration. The FWS does not count towards fulfilling concentration requirements.

Graduate Minor

Students wishing to complete a graduate minor in Latino Studies need to formally register with the Latino Studies Program office, take an upper level seminar (400/600) tentatively entitled "Introduction to Latino Studies: History and Methodologies," and work intensively with a faculty member outside of their major field. Over the course of their study they will be expected to take two other Latino Studies graduate or advanced undergraduate courses outside of their major field. In lieu of available courses, the student and his or her minor field adviser may design a special project that culminates in a paper given at a conference or presented for publication. Each special project requires the approval of the director of graduate studies for the minor field. In addition, graduate students will participate in the annual Latino Studies Colloquium. Upon completion of the minor, students receive a Certificate from the program. Students wishing to pursue the Graduate Minor Field in Latino Studies must file an application at the Latino Studies Program, 434 Rockefeller Hall.

Library

The Latino Studies Program Resource Center in 432 Rockefeller Hall serves Cornell students, faculty, staff, and the wider local community. The Resource Center maintains print and media material pertinent to U.S. Latino issues and also provides a meeting space for more than 25 Latino student organizations.

Courses

LSP 100 Introduction to World Music: Africa and the Americas (also MUSIC 103)
Spring. 3 credits. 1 hour discussion to be arranged. S. Pond.
Exploration of folk, popular, and traditional genres of the Western Hemisphere, particularly the African diaspora. The course examines both the elements of musical styles and the features of society that influence music. Listening assignments are major components of the course.

[LSP 110 Introduction to American Studies: New Approaches to Understanding American Diversity: The Twentieth Century (also AM ST 110 And HIST 111)
4 credits. Not offered 2001–2002. M. C. Garcia.
This course examines American national life in the twentieth century and asks questions about the changing meaning of national identity. What does it mean to be an American in the twentieth century? What does it mean to assimilate? Can on assimilate structurally and yet maintain a distinct cultural identity? In what ways do racial and ethnic perceptions structure political, economic, and cultural life? This is a team-taught interdisciplinary course in which students analyze historical, literary, and cultural evidence in exploring these and other issues.]

LSP 201 Latinos in the United States (also SOC 265 and RSOC 265)
Spring. 4 credits variable. T-R 2:55–4:10. H. Velez.
Exploration and analysis of the Hispanic experience in the United States. An examina-

tion of sociohistorical background and economic, psychological, and political factors that converge to shape a Latino group identity in the United States. Perspectives are suggested and developed for understanding Hispanic migrations, the plight of Latinos in urban and rural areas, and the unique problems faced by the diverse Latino groups. Groups studied include Mexican Americans, Dominicans, Cubans, and Puerto Ricans.

LSP 202 Spanish for English/Spanish Bilinguals (also SPANR 200)
Fall and spring. 3 credits. T R 11:40–12:55. N. Maldonado-Mendez.
A course designed to expand bilingual student's knowledge of Spanish providing them with ample opportunities to develop and improve each of the basic language skills.

[LSP 203 Comparative Migration to the Americas (also HIST 202 and AM ST 204)
4 credits. Not offered 2001–2002.
M. C. Garcia.
This seminar examines migration both within and to the Americas in the nineteenth and twentieth centuries. Topics discussed include the reasons for population movements; immigration policies; social, economic, and political accommodation; nativist and restictionist responses; and women and migration, remittances, and transnationalism. Among the immigrant-receiving nations studied are Argentina, Brazil, Canada, Cuba, Mexico, and the United States.]

LSP 219 Mexican Immigration to the United States (also HIST 219, AM ST 219, LASP 215)
Fall. 4 credits. T-R 1:25–2:40. J. Cárdenas.
This seminar course explores the historical and contemporary conditions and expressions of Mexican immigrants in the twentieth-century. We discuss issues such as: the history of the Southwest; historical ideologies and theories of immigration and national identity; socio-economic conditions; cultural displays of identity; the politics of Mexican immigration and activism; adaptation and resistance of Mexican immigrants and their children to "mainstream" culture; economic and social policies and their effects upon the Mexican immigrant communities; and trans-national identities and globalization.

LSP 220 Sociology of Health and Ethnic Minorities (also R SOC 220)
Fall. 3 credits. T-R 10:10–11:25. P. Parra.
Discusses the health status of minorities in the United States. Specifically, we explore intragroup diversity such as migration, economic status, and the influence of culture and the environment on health status and access to health care. Although special attention is given to Latino populations, discussion encompasses other minorities who face similar problems.

[LSP 221 Anthropological Representation: Ethnographies on Latino Culture (also AM ST 221, ANTHRO 221)
3 credits. Not offered 2001–2002.
V. Santiago-Irizarry.
Representation is basic to anthropology. In translating cultures, anthropologists produce authoritative representations of and about other people's lives. In this course, we examine with a critical eye, the production of representations about U.S. Latino cultures, as they are embodied in anthropological texts. Issues explored include the relation between the ethnographer and the people he or she is studying, the contexts in which ethnographic texts are produced, and the way they may position different cultural groups within the larger national context.]

[LSP 240 Survey in U.S. Latino Literature (also ENGL 240)
4 credits. Not offered 2001–2002.
M. P. Brady.]

LSP 246 Contemporary Narratives by Latina Writers (also SPANL 246, WOMNS 246)
Fall. 3 credits. T-TH 1:25–2:40. L. Carrillo.
This course offers a survey of narratives by representative Latina writers of various Latino ethnic groups in the United States including Chicana, Chilean, Cuban, Dominican, and Puerto Rican. We investigate the parallel development of a Latina perspective on personal, social and cultural issues alongside that of the U.S. ethnic liberation/revitalization movements of the 1960s through to contemporary feminist activism and women of color movements. We investigate these works as artistic attempts to deal with such issues as culture, language and bilingualism, family, gender, sexuality, and domesticity. We account for regional distinctions and contributions. Readings include works by Julia Alvarez, Gloria Anzaldúa, Elena Castedo, Ana Castillo, Denise Chávez, Sandra Cisneros, Judith Ortiz Cofer, Cristina García, Nora Glickman, Nicholasa Mohr, Cherríe Moraga, Archy Obejas, Esmeralda Santiago, Ana Lydia Vega, and Helena María Viramontes.

[LSP 260 Introduction to U.S. Latino History, Part I (also HIST 260, AM ST 259)
4 credits. Not offered 2001–2002.
M. C. Garcia.]

LSP 261 Introduction to U.S. Latino History, Part II (also HIST/AM ST 261)
Spring. 4 credits. T R 1:25–2:40.
M. C. Garcia.
This course, part II of a two-semester sequence, introduces students to the history of Latinos in the United States. In LSP/HIST/AM ST 261 we focus on Puerto Ricans, Cubans, and the Dominicans in the United States. (LSP/HIST 260; AM ST 259 focuses on Mexican Americans/Chicanos and Central Americans). Among the topics addressed are: historical immigration patterns and reasons for migration; the social and political events that shaped the evolution of these communities; the role of cultural identity, race, class, and gender in shaping experience; and the intersection of U.S. foreign policy and immigration policy.

[LSP 300 Latina Activism Feminist Theory
4 credits. Not offered 2001–2002.
This course examines the ways in which Latinas have participated as actors and subjects in various twentieth-century social and political struggles. Using different moments of participation as a point of departure, students then interrogate the feminist theories that have emerged in relation to these struggles. Through analyzing both the struggles and the attendants theories, the class maps out how "Latina" as a salient, ever-changing political, social, and cultural category is still being constructed and, thus, provides us a window onto the interplay between theory and history.]

[LSP 306 Latino Politics in the United States (also GOVT 306)
Not offered 2001–2002.]

LSP 319 Minority Politics in the United States (also GOVT 319)
Spring. 4 credits. T R 1:25–2:40.
M. Jones-Correa.
In 1965 the landscape of American politics changed dramatically with the passage of the Voting Rights Act. That same year, Congress passed the Immigration Reform Act, which though little heralded at the time, arguably has had equally profound effects. This course provides a general survey of minority politics in the United States, focusing on the effects of these two key pieces of legislation. The course highlights the relationships between immigrants and minorities, electoral politics and protest politics, and between cooperation and competition within and among minority groups. The purpose of the course is not only to pinpoint the similarities and differences in the agendas and strategies adopted by minority groups, but to indicate the interaction between "minority" politics and American politics as a whole.

LSP 366 Spanish in the United States (also LING 366 and SPANR 366)
Fall. 4 credits. Prerequisite: some knowledge of Spanish. T-R 10:10–11:25.
M. Suner.
This course provides an examination of major Spanish dialects in the United States from a linguistic perspective. Contrast is made to the standard language. Topics include borrowing, interference, and code switching. Special emphasis is on syntactic, morphological, and phonological characteristics.

LSP 377 The United States (also ANTHR/AM ST 377)
Fall. 4 credits. T R 11:40–12:55.
V. Santiago-Irizarry.
The anthropological inquiry into one's culture is never a neutral exercise. This course explores issues in the cultural construction of the United States as a "pluralistic" society. We look at the ideological context for the production of a cultural profile predicated upon ideas that are intrinsic to American images of identity such as individualism, freedom, and equality and the way these are applied in practice. The course readings include historic documents and accounts, popular writings, and recent ethnographies on the United States.

[LSP 396 U.S. Latino Prose Fiction (also SPANL 396)
4 credits. Conducted in Spanish. Not offered 2001–2002. D. Castillo.]

[LSP 400 Border Cultures
4 credits. Not offered 2001–2002.
This course centers "the border" as a physical, spatial, and cultural entity, taking as its starting point the belief that it is "not just a place on the map," as Adrienne Rich has suggested, but also "a place in history." In examining this "place," we focus on exploring the border as a site of transformative possibilities, one which opens up, complicates, and makes visible certain social tensions and intercultural exchanges. Throughout the semester we investigate several different aspects and moments of this exchange, beginning with a set of theoretical and conceptual readings that outline the themes guiding our approach to "the border." Primary emphasis is given to works that examine these issues in historical time and space.]

LSP 403 After Immigration (also S HUM 403, SPAN L 403)
Spring. 4 credits. R 2:30–4:25. D. Castillo.
Beginning with a close reading of Michael Jones-Correa's seminal study of Latinos in New York, *Between Two Nations*, we focus class discussion on recent Latin American immigration to the United States through two complementary perspectives and mediations on the immigrant experience: that of the individuals who have arrived in the U.S., and that of individuals who have chosen to remain in the countries of origin. The class studies films like *Neuwa Yol* and *Jardin de Edén*, Latin American authors like Carlos Fuentes, Ana Lydia Vega, and Ariel Dorfman, and U.S. Latinos like Julia Alvarez, Francisco Goldman, and Cristina Garcia. Students are encouraged to do individually-tailored research projects that may include autobiographical or ethnographic elements as well as literary analysis and theoretical inquiries.

[LSP 406 The Immigrant City: 1900–2000 (also S HUM 406, AM ST 406, HIST 412)
4 credits. Not offered 2001–2002.
M. C. Garcia.]

LSP 420/421 Independent Study
Fall and spring. 2–4 credits. Permission of instructor.
Guided independent study.

[LSP 462 Between Aztlan and Queens: Latina Culture in the Making of Space (also ENGL 462)
4 credits. Not offered 2001–2002.
M. P. Brady.
How do cultural practices like music and film produce space? What do freeways, zoning laws, advertising codes, and hiking trails have to do with literature? How have changing urban demographics and immigration shaped, even "Latinoized," cities, and how have these changes been reflected or restricted in Latino cultural production? How does paying attention to space change our reading practices? This interdisciplinary course examines these questions and explore how place and space shape Latina cultures and how Latina cultures shape place and space. We draw from scholarship in fields such as urban planning, law, architecture, geography, anthropology, literature, and history. Students should plan to do extensive reading, write two to three papers, and produce a substantial research paper.]

LSP 610 Political Identity: Race, Ethnicity, and Nationalism (also GOVT 610)
Fall. 4 credits. W 10:10–12:05.
M. Jones-Correa.
The social sciences generally treat ethnicity, nationalism and race as descriptive categories or variables, while avoiding actually defining these categories, or thinking about how they should be used. How should we go about describing ethnicity, nationalism, and race? Should we treat them as primordial or as social constructions? Much of the recent literature suggests the latter. If constructed, by whom are they constructed (or by what)? What constrains/structures these constructions? What purposes do these constructions serve? Whom do they serve? Are some constructions better representations of identity than others, and what does this mean? How should we go about applying these categories in political analysis?

[LSP 660 Latino Languages, Ideology, and Practice (also ANTHR 660)
4 credits. Not offered 2001–2002.
V. Santiago-Irizarry.
Cultural identity and citizenship in the United States have often been organized around linguistic difference and the issues this raises in an English-dominant society. Drawing from anthropological theories on language, this course looks at the place of language as a signifying practice in the United States by focusing on the experience of Latino communities. Topics explored include linguistic diversity and change, accomodation and resistance, language maintenance and shift, linguistic ideologies, the production of language hierarchies, and institutional applications of language.]

Law and Society

M. Fineman, co-director, 208 Myron Taylor Hall, 255–2622, fineman@law.mail.cornell.edu; Mary Katzenstein, co-director, M105 McGraw Hall, 255–8965, mfk2@cornell.edu, R. Breiger (sociology), C. Carmichael (comparative literature), D. A. Dunning (psychology), G. Hay (economics), P. Hyams (history), R. Lieberwitz (ILR), R. Miller (philosophy), M. B. Norton (history), R. Polenberg (history), D. Powers (Near Eastern studies), J. Rabkin (government), V. Santiago-Irizarry (anthropology), H. Shue (ethics and public life)

The Law and Society Program offers an interdisciplinary concentration for undergraduates who are interested in the law from the perspectives of the social sciences and the humanities: anthropology, comparative literature, economics, government, history, philosophy, psychology, science and technology studies, and sociology. Students who wish to graduate with a concentration in law and society should consult the director of the program or one of the advisers listed above to plan a coherent program of study. Admission to the concentration has to be approved by the director of the program. Such a program should ordinarily include at least four courses from the following list. At least two of the courses should fall outside the student's major. Particular attention is drawn to GOVT 313 and PSYCH 265, which past students have often taken. Other courses may be substituted with the approval of the adviser. The Law and Society Program is an activity of the Program on Ethics and Public Life. Inquiries can be directed to: the EPL Administrative Assistant, 240 Goldwin Smith Hall, 255–8515, epl@cornell.edu.

AM ST 336 Capitalism and Society in Developing America, 1607–1877 (also HIST 336)

ANTHR 328 Conflict, Dispute Resolution, and Law in Cultural Context

ARME 320 Business Law I

ASIAN 338 Democracy and War (also HIST 338)

AS&RC 280 Racism in American Society (also HIST 280)

B&SOC 205 Ethical Issues in Health and Medicine (also S&TS 205)

B&SOC 406 Biotechnology and Law (also S&TS 406)

B&SOC 407 Law, Science, and Public Values (also GOVT 407 and S&TS 407)

B&SOC 427 The Politics of Environmental Protection in American (also GOVT 427, S&TS 427)

COM L 326 Christianity and Judaism (also RELST 326)

COM L 328 Literature of the Old Testament (also RELST 328)

COM L 429 Legal Issues in Business and Electronic Communication

CRP 380 Environmental Politics

CRP 451–551 Environmental Law

ECON 335 Public Finance and Resource Allocation

ECON 336 Public Finance: Resource Allocation and Fiscal Policy

ECON 404 Economics and the Law

GOVT 111 Introduction to American Government and Politics

GOVT 260 Social and Political Theory (also PHIL 260)

GOVT 294 Global Thinking (also PHIL 294)

GOVT 313 The Nature, Functions, and Limits of Law

GOVT 324 Legal Reasoning and Legal Adaptation

GOVT 327 Civil Liberties in the United States

GOVT 328 Constitutional Politics: The United States Supreme Court

GOVT 364 The Selfish Individual and the Modern World

GOVT 389 International Law

GOVT 407 Law, Science, and Public Values (also B&SOC 407 and S&TS 407)

GOVT 410 Legislatures, Courts, and Public Policy

GOVT 428–429 Government and Public Policy: An Introduction to Analysis and Criticism

GOVT 462 Modern Political Philosophy (also PHIL 346)

GOVT 466 Feminism and Gender Discrimination (also WOMNS 466)

GOVT 469 Limiting War (also PHIL 369)

GOVT 474 Community, Nation, and Morality (also PHIL 446)

GOVT 489 International Law and Regime Development

HD 233 Children and the Law

HIST 318 American Constitutional Development

HIST 336 Capitalism and Society in Developing America, 1607–1877 (also AM ST 336)

HIST 338 Democracy and War (also ASIAN 338)

HIST 368 Marriage and Sexuality in Medieval Europe (also WOMNS 368)

HIST 372–652 Introduction to Islamic Law (also NES 351/651, RELST 350)

HIST 436 Conflict Resolution in Medieval Europe

HIST 440 Undergraduate Seminar in Recent American History

HSS 280 Racism in American Society (also AS&RC 280)

ILRCB 607 Values in Law, Economics, and Industrial Relations

NES 351/651 Introduction to Islamic Law (also HIST 372/652, RELST 350)

NES 357 Islamic Law and Society (also RELST 356)

NTRES 401 Environmental and Natural Resources Policies

PAM 280 Race, Power, and Privilege in the United States

PAM 341 Economics of Consumer Law

PHIL 145 Contemporary Moral Issues

PHIL 241 Ethics

PHIL 242 Social and Political Philosophy (by petition for breadth requirement) (also GOVT 260)

PHIL 294 Global Thinking (also GOVT 294)

PHIL 319 Philosophy of Marx

PHIL 342 Law, Society and Morality

PHIL 346 Modern Political Philosophy (also GOVT 462)

PHIL 369 Limiting War (also GOVT 469)

PHIL 444 Contemporary Legal Thought

PHIL 446 Topics in Social and Political Philosophy (also GOVT 474)

PSYCH 265 Psychology and Law

RELST 326 Christianity and Judaism (also COM L 326)

RELST 328 Literature of the Old Testament (also COM L 328)

RELST 350 Introduction to Islamic Law (also NES 357)

RELST 356 Islamic Law and Society (also NES 357)

S&TS 406 Biotechnology and Law (also B&SOC 406)

S&TS 407 Law, Science, and Public Values (also GOVT 407 and B&SOC 407)

S&TS 427 Politics of Environmental Protection in America (also B&SOC 427, GOVT 427)

SOC 310 Sociology of War and Peace

SOC 354 Law and the Social Order

WOMNS 368 Marriage and Sexuality in Medieval Europe (also HIST 368)

WOMNS 466 Feminism and Gender Discrimination (also GOVT 466)

Lesbian, Bisexual, and Gay Studies

B. Anderson, D. Bem, S. Bem, A. Berger, J. Borneman, M. P. Brady, B. Correll, J. Culler, I. DeVault, N. Furman, J. E. Gainor, I. V. Hull, M. Jacobus, K. Jones, M. Katzenstein, T. Loos, K. March, S. McConnell-Ginet, K. McCullough, T. Murray, M. B. Norton, J. Peraino, J. Piedra, R. Savin-Williams, R. Schneider, A. M. Smith, A. Villarejo, R. Weil

The field of Lesbian, Bisexual, and Gay Studies is devoted to the interdisciplinary study of the social construction of sexuality. LBG Studies is founded on the premise that the social organization of sexuality is best studied from the perspectives offered by those positions that have been excluded from established cultural norms.

In addition to offering a graduate minor, the field of LBG Studies now offers an undergraduate concentration, which is administered under the auspices of the Women's Studies Program and which consists of four courses from the list below. Although most of the courses in LBG Studies (including those on men) generally fall under the aegis of the Women's Studies Program and are hence crosslisted with it, not all of the courses in Women's Studies are sufficiently focused enough on the social construction of sexuality per se to be part of the LBG Studies concentration. In order to qualify for the concentration, courses must devote a significant portion of their time to sexuality and to questioning the cultural and historical institution of exclusive heterosexuality. Students selecting their four courses from the LBG Studies subset must identify their concentration as either LBG Studies or Women's Studies; they cannot double-count their credits and thereby use the same courses for both concentrations.

Students interested in the LBG Studies concentration should contact the Lesbian, Bisexual, and Gay Studies Office in 379 Uris Hall.

Courses

ANTHR 200 Cultural Diversity and Contemporary Issues
Fall. 3 credits. J. Borneman.
For description, see ANTHR 200.

ANTHR 321/621 Sex and Gender in Cross-Cultural Perspective (also WOMNS 321/631)
Fall. 4 credits. D. Doukas.
For descriptions, see ANTHR 321/621.

[ENGL 278 Queer Fiction (also WOMNS 279)
Not offered 2001–2002. E. Hanson.]

[ENGL 327 Shakespeare: Gender and Society (also WOMNS 327)
Not offered 2001–2002. B. Correll.]

[ENGL 355 Decadence (also WOMNS 355)
Not offered 2001–2002. E. Hanson.]

[ENGL 377 Gay Fiction (also WOMNS 376)
Not offered 2001–2002. E. Hanson.]

[ENGL 395 Video: Art, Theory, Politics (also THETR 395)
Not offered 2001–2002. T. Murray.]

[ENGL 424 Studies in Renaissance Lyric
Not offered 2001–2002. B. Correll.]

[ENGL 608 Seminar in Cultural Studies: Race, Drugs and Gender
Not offered 2001–2002. M. P. Brady.]

[ENGL 654 Queer Theory (also WOMNS 654 and COM L 654)
Not offered 2001–2002. E. Hanson.]

[ENGL 655 Decadence (also WOMNS 656 and COM L 655)
Not offered 2001–2002. E. Hanson.]

[ENGL 660 Cinematic Desire (also AM ST 662 and WOMNS 661)
Not offered 2001–2002. E. Hanson.]

[ENGL 703 Theorizing Film: Race, Nation, and Psychoanalysis (also FRLIT 695)
Not offered 2001–2002. T. Murray.]

[FRLIT 493 French Feminisms (also WOMNS 493)
Not offered 2001–2002. N. Furman.]

[GERST 413 The Women around Freud
Not offered 2001–2002. B. Martin.]

[GERST 614 Gender at the Fin-de-siècle
Not offered 2001–2002. B. Martin.]

GERST 641 The Gay Critic
Fall. 4 credits. P. Rehberg.
For description, see GERST 641.

[GOVT 353 Feminist Movements and the State (also WOMNS 353)
Not offered 2001–2002. M. Katzenstein.]

[GOVT 415 Race, Gender, and Organization (also WOMNS 415)
Not offered 2001–2002. M. Katzenstein and J. Reppy.]

[GOVT 467 Radical Democratic Feminisms (also WOMNS 468)
Not offered 2001–2002. A. M. Smith.]

[GOVT 486 Gender, Nationalism, and Conflict (also WOMNS 487)
Not offered 2001–2002. M. Katzenstein.]

[HD 284 Introduction to Sexual Minorities (also WOMNS 285)
Not offered 2001–2002. R. Savin-Williams.]

HD 464 Sexual Minorities and Human Development (also WOMNS 467)
Spring. 4 credits. R. Savin-Williams.
For description, see HD 464.

[HIST 378 Topics in U.S. Women's History (also WOMNS 378)
Not offered 2001–2002. M. B. Norton.]

[HIST 480 Gender Adjudicated (also ASIAN 488 and WOMNS 480)
4 credits. Not offered 2001–2002. T. Loos.]

[HIST 626 American Women's History (also WOMNS 626)
Not offered 2001–2002. M. B. Norton.]

[LING 244 Language and Gender (also WOMNS 244)
Not offered 2001–2002; next offered fall 2002. S. McConnell-Ginet.]

[MUSIC 492 Music and Queer Identity (also WOMNS 494)
4 credits. Not offered 2001–2002. J. Peraino.]

[PSYCH 277 Social Construction of Gender (also WOMNS 277)
3 credits. Not offered 2001–2002. S. Bem.]

PSYCH 450/650 Gender and Clinical Psychology (also WOMNS 450/650)
Fall. 4 credits.
For description, see PSYCH 450/650.

[SPAN L 384 Literature and Revolution
Not offered 2001–2002. J. Piedra.]

[SPAN L 400 Maricoteoría/Queer Theory
Not offered 2001–2002. J. Piedra.]

[THETR 320 Queer Theatre
Not offered 2001–2002. J. E. Gainor and D. Matson.]

[THETR 336 American Drama and Theatre (also ENGL 336)
Not offered 2001–2002. J. E. Gainor.]

THETR 339 Theories and Techniques of Twentieth-Century Western Theatre
Spring. 3 credits. R. Schneider.
For description, see THETR 339.

[THETR 436 The Female Dramatic Tradition (also WOMNS 433)
Not offered 2001–2002. J. E. Gainor.]

[THETR 637 Seminar in Dramatic Theory
Not offered 2001–2002. R. Schneider.]

WOMNS 211 Introduction to Feminist Theory
Fall. 4 credits. K. McCullough.
For description, see WOMNS 211.

WOMNS 405/605 Domestic Television
Spring. 4 credits. A. Villarejo.
For description, see WOMNS 405/605.

[WOMNS 465 Feminist Theory/Lesbian Theory (also GERST 465 and COM L 465)
Not offered 2001–2002. A. Villarejo.]

[WOMNS 610 Sexuality and the Politics of Representation (also THETR 610)
Not offered 2001–2002. A. Villarejo.]

[WOMNS 621 Lesbian, Gay, Bisexual Studies (also GERST 621)
Not offered 2001–2002. B. Martin.]

Medieval Studies

P. R. Hyams, director; F. M. Ahl, C. M. Arroyo, R. Brann, K. W. Brazell, C. Brittain, E. W. Browne, R. G. Calkins, R. T. Farrell, A. S. Galloway, A. B. Groos, W. E. Harbert, T. D. Hill, J. J. John, C. V. Kaske, W. J. Kennedy, S. MacDonald, M. Migiel, J. M. Najemy, J. A. Peraino, C. A. Peterson, J. R. Piggott, D. S. Powers, S. Senderovich, D. R. Shanzer, S. M. Toorawa, W. Wetherbee (emerita: A. M. Colby-Hall)

Undergraduate Study in Medieval Studies

The "middle" in "Middle Ages" comes from its position between late antiquity and the early modern period, a conception created for European and Western conditions. Our concentration, however, is more properly inclusive and treats a time span from roughly the fifth century into the sixteenth and ranges from Western Europe and the Mediterranean to China and Japan. To discover the vibrant state of medieval studies today, one need only look at the extraordinary range of scholarly, but accessible, web sites that have sprung up all over the Internet. Cornell possesses a wealth of faculty and library resources to introduce students to every corner of the field. While this concentration provides strong interdisciplinary breadth to majors in classics, any of the modern languages, history, music, philosophy, etc., and is excellent preparation for graduate study in a medieval field, it could complement a science major as well. Many students feel bound to choose their majors with an eye to future careers and earning potential. The program provides encouragement, guidance, and an avenue for intelligent enjoyment of an important part of all our pasts.

This concentration offers something different and extra. Coursework in Medieval Studies enhances the student's enjoyment and understanding of the artistic and material relics of the Middle Ages: Gregorian chant, manuscripts and stained glass windows, Gothic cathedrals, Crusader castles, and picturesque towns cramped within ancient walls. The student will discover the serious realities involved in, and shaped by, Arthurian tales of brave knights and fair ladies, dungeons, dragons, and other marvels. Students can analyze and appreciate the horrors of the Black Death, triumphs in courtly love and pitched battle, swords and scimitars, caliphs and popes, fear of demons and djinns, and the reassuring presence of angels.

The period saw many of the foundational choices that have, for good and ill, made the world what it is today. Many of our current challenges in the fields of law, human rights, attitudes toward power, authority, gender relations, and sexual mores are derived from the ways in which society was formulated a millennium ago. The Medieval Studies Program houses a vital undergraduate association, Quodlibet, that arranges frequent lectures on medieval topics and Readings of prose and poetry in many medieval languages.

Undergraduates who wish to undertake an independent major or concentration in Medieval Studies should consult the director of the program, 259 Goldwin Smith Hall, 255–8545, medievalst@cornell.edu.

The Undergraduate Concentration in Medieval Studies shall consist of five medieval courses (at the 200 level or above) in at least two different disciplines, of which up to two may also count towards the major, and one must come from our list of approved "core courses."

Medieval Languages

Medieval texts (like all others) become most lively and informative when read in the original, and Cornell fortunately offers many courses for students interested in acquiring the relevant skills: Classical Arabic, Medieval Hebrew, Medieval Latin, Classical Chinese, Historical Sino-Japanese (Kambun) 700–1300 and Historical Sino-Japanese 1300–1600, Old English, Middle English, Gothic, Old Saxon, Old High German, Middle High German, Old Norse-Icelandic, Old Irish, Middle Welsh, Old Occitan (Provençal), Old French, Medieval Spanish, Medieval Italian, Old Russian, and Old Church Slavonic.

Some medieval languages require study of a modern language (e.g., French for Old Occitan and Old French) or a classical language (Classical Latin for Medieval Latin) as background. Students interested in a concentration in Medieval Studies should begin the study of a medieval language as early as possible, so that they may be able to study texts in the original before they graduate. Students are advised to consult the sponsoring departments for information about the prerequisites for various medieval languages.

Graduate Study

The Medieval Studies Program offers both an interdisciplinary and a literary comparative Ph.D. in Medieval Studies. Disciplinary fields of concentration offered within the Field of Medieval Studies are: Medieval Archaeology, Medieval History, Medieval History of Art, Medieval Literature, Medieval Music, Medieval Philology and Linguistics, and Medieval Philosophy. Information about the graduate program in Medieval Studies is contained in the catalog of the Graduate School, in a brochure on Medieval Studies available from the field coordinator, and at "Cornucopia," the program's web site, www.arts.cornell.edu/medieval.

Medieval Studies Courses: Graduate and Undergraduate

Courses in various aspects of Medieval Studies are offered every year in several cooperating departments, including Asian Studies, Classics, Comparative Literature, English, German Studies, History, History of Art, Linguistics, Music, Near Eastern Studies, Philosophy, Romance Studies, Russian Literature, and by the Society for the Humanities. The current year's offerings are:

***ART H 230 Monuments of Medieval Art (also RELST 230)**
Spring. 4 credits. R. G. Calkins.

***ART H 332 Medieval Architecture (also ARCH 382, RELST 332)**
Fall. 4 credits. R. G. Calkins.

***ART H 337 The Medieval Illuminated Book (also RELST 337)**
Fall. 4 credits. R. G. Calkins.

***ART H 531 Problems in Medieval Art and Architecture (also RELST 531)**
Spring. 4 credits. R. G. Calkins.

CHLIT 213 Classical Chinese
Fall. 3 credits. R. McNeal.

CHLIT 307 Readings in Classical Chinese Literature
Fall. 4 credits. D. Warner.

CLASS 331 Goths, Vandals, Franks, and Romans
Fall. 4 credits. D. R. Shanzer.

CLASS 363 Intensive Medieval Latin
Summer. 4 credits. D. R. Shanzer.

CLASS 403 Independent Study—Sanskrit
Fall. Variable credit. C. Minkowski.

ENGL 274 Scottish Literature and Culture
Fall. 3 or 4 credits. H. Shaw and T. Hill.

ENGL 308 Icelandic Family Saga
Fall. 4 credits. T. Hill.

ENGL 311/611 Old English
Fall. 4 credits. R. Farrell.

ENGL 312/612 Beowulf
Spring. 4 credits. T. Hill.

ENGL 319/619 Chaucer
Fall. 4 credits. R. Farrell.

ENGL 321 Spenser and Malory
Spring. 4 credits. C. Kaske.

ENGL 417/617 Early Medieval Archaeology and Literature
Spring. 4 credits. R. Farrell.

ENGL 424/624 Spenser
Fall. 4 credits. C. Kaske.

ENGL 710 Advanced Old English
Spring. 4 credits. T. Hill.

***HIST 262 The Middle Ages: Introduction and Sampler (also RELST 265)**
Spring. 4 credits. P. Hyams.

***HIST 297/597 Japan before 1600 (also ASIAN 297/597)**
Fall. 4 credits. J. Piggott.

***HIST 310 Life, Literature and Power in Late Medieval England (also ENGL 314)**
Fall. 4 credits. P. Hyams and A. Galloway.

HIST 351 Machiavelli (also ITALL 351)
Fall. 4 credits. J. Najemy.

***HIST 360 Early Warfare, East and West**
Fall. 4 credits. C. A. Peterson.

HIST 369 The History of Florence in the Time of the Republic, 1250-1530 (also ITALL 369)
Spring. 4 credits. J. Najemy.

***HIST 447 Crusaders and Chroniclers**
Fall. 4 credits. P. Hyams.

***HIST 468 Love and Sex in the Italian Renaissance**
Spring. 4 credits. J. Najemy.

HIST 490/690 Tales of the Heike (also ASIAN 490/690)
Fall. 4 credits. J. Piggott.

***HIST 492 Undergraduate Seminar: Medieval Chinese History**
Fall. 4 credits. C. A. Peterson.

***HIST 651 Old English Literature in its Historical Context**
Spring. 4 credits. P. Hyams.

HIST 663 Graduate Seminar in Renaissance History
Fall. 4 credits. J. Najemy.

ITALL 220 Medieval Italy
Spring. 3 credits. M. Migiel.

ITALL 427 Dante's Divine Comedy (also ENGL 607)
Spring. 4 credits. W. Wetherbee.

ITALL 437/637 Italian Renaissance Epic
Fall. 4 credits. M. Migiel.

LING 217 History of the English Language (also ENGL 217)
Fall. 4 credits. W. Harbert.

LING 315–316 Old Norse
315, fall; 316, spring. 4 credits each term. E. Johannsson.

LING 441 Introduction to German Linguistics (also GERST 441)
Fall. 4 credits. W. Harbert.

LING 661 Old Church Slavonic (also RUSSA 601)
Fall. 4 credits. E. W. Browne.

LING 662 Old Russian Texts (also RUSSA 602)
Spring. 4 credits. E. W. Browne.

LING 671 Comparative Slavic Linguistics (also RUSSA 651)
Fall. 4 credits. E. W. Browne.

MUSIC 681 Seminar in Medieval Music: Medieval Music and Notation
Fall. 4 credits. J. Peraino.

***NES 255 Introduction to Islamic Civilization (also HIST 253, RELST 255)**
Fall. 3 credits. D. Powers.

NES 313 Classical Arabic Texts (also RELST 313)
Fall. 4 credits. D. Powers.

***NES 339 Islamic Spain: Culture and Society (also COM L 334, JWST 339, RELST 334, SPANL 339)**
Fall. 4 credits. R. Brann.

***PHIL 315 Medieval Philosophy**
Spring. 4 credits. S. MacDonald.

PHIL 410 Latin Philosophical Texts
Fall and spring. Variable credit. S. MacDonald.

SANSK 131 Elementary Sanskrit (also CLASS 131, LING 131)
Fall. 4 credits. C. Minkowski.

***S HUM 401 The Soul in Medieval Culture**
Fall. 4 credits. R. Ziomkowski.

***SPANL 440 Medieval Spanish Literature**
Fall. 4 credits. C. Arroyo.

Modern European Studies Concentration

Susan Tarrow, coordinator

Students from any college may choose an undergraduate concentration in Modern European Studies to complement any major in any college. The purpose of the concentration is to provide a coherent structure for students with an interest in interdisciplinary study in the field of European studies.

The concentration has three tracks: European politics, economics, and society; modern European history; and European culture. The requirements for the concentration are:

1) Competence in at least one modern European language, Romance, Germanic, or Slavic (i.e., completion of a 300-level course or equivalent with a grade of at least B-, or demonstration of an advanced level of competence in an oral proficiency interview test where available).

2) Completion of two interdisciplinary core courses:

   GOVT 341/SOC 341: Modern European Society and Politics
   Spring 2002. 4 credits. S. G. Tarrow.

   COM L 353/HIST 363: European Cultural History 1870–1945
   Spring 2002. 4 credits. M. Steinberg.

Under certain conditions, students may be permitted to substitute other courses for those listed above.

3) Completion of one course in modern (post-1789) European history.

4) Two additional courses in any of the three areas, which may include a senior seminar (400 level).

   a) Courses in European and comparative politics, anthropology, sociology, women's studies, and related courses in the School of Hotel Administration, the College of Agriculture and Life Sciences, and the School of Industrial and Labor Relations.

   b) Courses in modern European history (post-1789).

   c) Courses in (post-1789) English and European literatures, comparative literature, semiotics, fine arts, architecture, music, philosophy, film and theatre arts, and women's studies.

Only two courses may be used to satisfy requirements for both the major and the concentration. Courses satisfying the breadth and distribution requirements in the College of Arts and Sciences, however, *may* be applied to the concentration. Students interested in completing a research project under the European Summer Research Program may apply for The Wood Fellowship in their junior year. All concentrators are encouraged to participate in the Language House Program, and to spend a semester or more in a program of study in Europe. Courses taken abroad may be applied to the concentration if they are approved for Cornell credit.

Undergraduates in the College of Arts and Sciences can major in European Studies through the Independent Major or College Scholar programs.

Departmental advisers include: D. Greenwood (anthropology); C. Otto (architecture); L. Abel (College Scholars, Independent Majors); S. Christopherson (CRP); G. Fields (economics); D. Schwarz (English); A. Schwarz (German studies); J. Pontusson (government); J. Weiss (history); C. Rosen (linguistics); M. Suñer (linguistics); N. Zaslaw (music); S. Tarrow (romance studies); G. Shapiro (Russian literature); S. G. Tarrow (sociology); D. Bathrick (theatre, film, dance)

For a list of relevant courses and seminars, and any further information, contact Susan Tarrow, coordinator of the Modern European Studies Concentration, at the Institute for European Studies, 120 Uris Hall (telephone 255–7592, e-mail SRT2@cornell.edu).

Religious Studies

J. M. Law, director; B. Adams, C. M. Arroyo, P. Becker, D. Boucher, R. Brann, R. G. Calkins, C. M. Carmichael, K. Clinton, J. Fajans, D. Fredericksen, D. Gold, S. Greene, K. Haines-Eitzen, J. S. Henderson, T. D. Hill, D. Holmberg, P. R. Hyams, J. J. John, C. V. Kaske, W. J. Kennedy, S. MacDonald, D. Mankin, K. S. March, C. Minkowski, R. L. Moore, D. I. Owen, J. R. Piggott, D. S. Powers, G. Rendsburg, J. S. Rusten, P. S. Sangren, D. R. Shanzer, S. Toorawa, M. Washington

The Religious Studies Program, an academic unit providing a major in the scholarly study of religion through the College of Arts and Sciences, offers a wide variety of courses. In addition to courses addressing with various approaches to and topics in the study of religion, we have integrated curricula within our program for in-depth studies of Judaism, Christianity, the Hindu tradition, and Buddhism. We also offer an increasing number of courses on Islam.

The Religious Studies Program is designed to meet the needs of three classes of students: (1) students planning to pursue advanced degrees in the academic study of religion or allied disciplines or subdisciplines (history of religions, religion and literature, religion and psychology, ethics, theology, area studies, etc.); (2) students seeking courses on topics relating to religion to fulfill distribution requirements; and (3) those students desiring a more systematic exposure to the academic study of religion as a significant component of their liberal arts experience. To all students, our program offers an excellent opportunity to develop a deeper understanding and appreciation of the complex ways in which religious traditions, with their individual, communal, and doctrinal dimensions inform human thought and behavior. The courses offered through our program are built on the established scholarly tradition of the study of religion as an academic, as opposed to confessional, pursuit. Religious traditions are explored in all of their complexity through comparative, contextual (in specific historical or cultural contexts), and thematic studies.

The program also hosts lecture series, conferences, symposia, and periodic social gatherings for faculty and students throughout the academic year to foster a sense of intellectual community among our students and faculty.

The Major in Religious Studies

Signing into the major: To sign into the major in Religious Studies, a student must have completed at least one course in Religious Studies prior to scheduling an appointment with the program director. Here is the process:

1) Schedule an appointment with Professor Jane-Marie Law, Director of Religious Studies; please contact her by e-mail: jml16@cornell.edu.

2) In addition to a copy of your current Cornell transcript (the informal one you regularly receive is acceptable), please bring to your meeting with Professor Law all of these forms, which are available in the Religious Studies office:

   a) a completed Religious Studies Major Application Form (available in Rockefeller 182)

   b) a proposed "Course of Study," which will be used as a guide in your conversation with the director and revised for formal submission to the program upon your entrance as a major

   c) a College of Arts & Sciences Adviser/Major form which will be signed by the director and your adviser.

Advising in the Religious Studies Program: Upon entering the major in Religious Studies, a student is assigned a faculty adviser whose area of expertise most closely matches the proposed interest of the student. An up-to-date approved adviser list is available in the Religious Studies office. Please note that not all faculty who cross-list courses with RELST can serve as an RELST adviser. Working closely with one's RELST adviser when selecting courses is an important component of this program, enabling students to fulfill the requirements for the major while creating an integrated and coherent course of study out of our large number of multidisciplinary course offerings.

To graduate as a major in Religious Studies, a student must (1) complete with letter grades the program's three core courses, RELST 250, Intro to Asian Religions; RELST 251, Intro to Judaism, Christianity, and Islam, and RELST 449, History and Methods of the Academic Study of Religion. (These three core courses can not be waived); and (2) complete with letter grades seven additional courses approved for the major, at least four of them at the 300 level or above. The following specifications of this second requirement are designed to promote breadth (2a) and depth (2b) of study.

(2a) At least four of a major's seven additional courses are to be selected to ensure some familiarity with two (or more in special cases) different religious traditions or phenomena. These courses may be at the introductory or advanced levels, though depth work at the 300 level or above is advised. For example, "Introduction to Asian Religions" (RELST 250) might lead a student to take "Japanese Religions" (RELST 355), and then combine these with two courses on Judaism, "Introduction to Ancient Judaism" (RELST 244) and "Cultural History of Jews of Spain" (RELST 239).

(2b) At least two of these seven additional courses are to be selected to ensure depth of coverage in one religion or one group of closely related religious traditions or phenomena. In the first illustrative case described above, the student might combine "The Religious Traditions of India" with "Tantric Traditions" (RELST 347) or "Indian Devotional Poetry" (RELST 348) to acquire a measure of specialist strength in the religions of India. Alternatively, that student might combine "Introduction to Asian Religions" with one or more courses dealing with Buddhism, such as "Chinese Buddhism" (RELST 357) or "Tibetan Buddhism" (RELST 400), to develop an appropriate depth along a different dimension. No more than one of the courses chosen to meet requirement 2a may be used to satisfy requirement 2b. Routinely, survey courses (which in our program are offered at the 200 level) should be combined with geographically specific offerings at the 300 and 400 level to satisfy this aspect of the requirements.

To engage in the kind of focused study envisioned under 2b, a student will be expected to attain proficiency in a language other than English to gain access to relevant sources, primary or secondary. For example, a knowledge of Greek or Latin might be required for the study of Christianity (as well as Greek or Roman religions); of Hebrew or Aramaic for Judaism; of Arabic for Islam; of Sanskrit or Hindi for Hinduism; or of Sanskrit, Pali, Chinese, or Japanese for Buddhism. In certain cases, nonclassical European languages can be used to fulfill this requirement. Religious phenomena like shamanism or totemism, though less firmly rooted in literary traditions, have generated substantial bodies of important scholarship in French and German, and an undergraduate major concentrating in this area of Religious Studies should be equipped to make independent use of such material. Customarily, courses used to satisfy this foreign language proficiency requirement may not be applied to the course requirements described under 2a and 2b. Choice of language to fulfill this requirement is determined by the student in consultation with his or her adviser and is decided at the time the student enters the major.

Most courses approved for the major are offered by cooperating departments within the College of Arts and Sciences; a comprehensive up-to-date list of these courses is maintained at the office of the Religious Studies Program, 182 Rockefeller Hall.

Graduating with Honors in Religious Studies:

GENERAL INFORMATION

1. **Eligibility.** 3.0 cumulative average and 3.5 average inside the major with no grade in the major below B-. Program Director notifies eligible candidates during the spring semester of the junior year, or prior to commencement of final year.

2. **Honors Courses.** Candidates must sign into RELST 495 (Senior Honors Essay) for up to eight credits (two courses) for two semesters with variable credit. This two-semester sequence is recommended but not required. After the first term, an R in the transcript indicates that this course (usually for 8 credits) is a yearlong course. When the project is completed at the end of the second semester, the grade recorded counts for all eight credits. (The eight-credit limit is the result of the conviction/belief that earning more than eight credits for a single "piece" of your undergraduate education is unwise.)

   You submit your honors proposal (with and according to the program's instruction/cover sheet) to the Religious Studies administrator before the end of the spring term of your junior year, or not later than Sept. 15 of the final year. She/he then approves your signing into the honors courses.

3. **Honors Committee—three faculty members.** While you are required to have three faculty members on your committee at the time of the submission of the final draft, we only require that two of them be identified when you submit your proposal. In the event the adviser is on leave, the program will assign a committee member from the list of approved RELST advisers. The three members should be:

   a. The professor who has agreed to work closely with you over the year and to be the supervisor/grader of your project is chair of the committee.

   b. Your Religious Studies major adviser (not optional)

   c. Another knowledgeable faculty member

   Sometimes your adviser is the supervisor/chair. If that is the case, you need two additional knowledgeable professors for your committee of three.

Courses Approved for the Major Sponsored by Religious Studies

[RELST 123–124 Elementary Biblical Hebrew I and II (also NES 123–124, JWST 123–124)

123, fall; 124, spring. 3 credits. Enrollment limited to 17 students. Not offered 2001–2002. Staff.

For description, see NES 123–124.]

[RELST 131 Elementary Pali (also Pali 131–132)
Fall. 3 credits. Not offered 2001–2002. Staff.]

[RELST 150 Introduction to American Religion (also SOC 150)
Fall. 3 credits. Not offered 2001–2002. P. Becker.]

[RELST 197 Introduction to Near Eastern Civilization (also NES 197, JWST 197)
Fall. 3 credits. Not offered 2001–2002. D. Owen.]

[RELST 203 Religion and Family in the U.S. (also SOC 201, R SOC 202)
Fall. 3 credits. Not offered 2001–2002. P. Becker.]

RELST 220 Buddhism in America (also ASIAN 220)
Winter. 3 credits. J. M. Law.
See ASIAN 220 for description.

[RELST 223 Introduction to the Hebrew Bible I (also NES 223, JWST 223)
Fall. 3 credits. Not offered 2001–2002. G. Rendsburg.
For description, see NES 223.]

[RELST 224 Introduction to the Hebrew Bible II (also NES 224, JWST 224)
Fall. 3 credits. Not offered 2001–2002. G. Rendsburg.
For description, see NES 224.]

[RELST 227 The Bible and the Literature of the Ancient Near East (also NES 227 and RELST 227)
Spring. 3 credits. Not offered 2001–2002. J. Zorn.
See NES 227 for description.]

[RELST 229 Introduction to the New Testament (also NES 229, JWST 229)
Fall. 3 credits. Not offered 2001–2002. K. Haines-Eitzen.
For description, see NES 229.]

RELST 230 Monuments of Medieval Art (also ART H 230)
Spring. 4 credits. R. G. Calkins.
For description, see ART H 230.

[RELST 237 Greek Religion and Mystery Cults (also CLASS 237)
Spring. 3 credits. Not offered 2001–2002. K. Clinton.
For description, see CLASS 237.]

RELST 239 Cultural History of Jews of Spain (also NES 239, JWST 239, SPAN L 239)
Spring. 3 credits. Staff.
For description, see NES 239.

[RELST 244 Introduction to Ancient Judaism (also NES 244, JWST 244) @ #
Spring. 3 credits. Not offered 2001–2002. G. Rendsburg.
For description, see NES 244.]

RELST 246 Jewish Mysticism (also NES 246, JWST 246)
Fall. 3 credits. M. Segol.
See NES 246 for description.

RELST 250 Introduction to Asian Religions (also ASIAN 250)
Spring. 3 credits. J. M. Law.
For description, see ASIAN 250.

[RELST 251 Judaism, Christianity, and Islam (also JWST 251, NES 251)
Fall. 3 credits. Not offered 2001–2002. R. Brann and K. Haines-Eitzen.
For description, see NES 251.]

[RELST 253 Black Religious Traditions from Slavery to Freedom (also HIST 251, AM ST 251)
Fall. 4 credits. Not offered 2001–2002. M. Washington.]

[RELST 254 Muhammad and Mysticism in the Literatures of the Muslim World (also NES 250)
Spring. 3 credits. Not offered 2001–2002. S. Toorawa.
For description, see NES 250.]

RELST 255 Introduction to Islamic Civilization I (also NES 255, HIST 253)
Fall. 3 credits. D. Powers.
For description, see NES 255.

RELST 256 Introduction to the Q'uran (also NES 256, JWST 256)
Spring. 3 credits. S. Toorawa.
See NES 256 for description.

RELST 262 Religion and Reason (also PHIL 263)
Spring. 4 credits. S. MacDonald.
For description, see PHIL 263.

RELST 263 The Earlier Middle Ages (also HIST 263)
Fall. 4 credits. J. J. John.
For description, see HIST 263.

RELST 264 Introduction to Biblical History and Archaeology (also NES 263, JWST 263, ARKEO 263)
Spring. 3 credits. J. Zorn.
For description, see NES 263.

RELST 265 The Middle Ages: An Introduction (also HIST 262)
Spring. 4 credits. P. Hyams.

RELST 277 Meditation in Indian Culture (also ASIAN 277)
Spring. 3 credits. D. Gold.
For description, see ASIAN 277.

[RELST 290 Buddhism: A Survey (also ASIAN 299)
Fall. 4 credits. Not offered 2001–2002. D. Boucher.
For description, see ASIAN 299.]

[RELST 295 Introduction to Christian History (also NES 295, JWST 295, HIST 299)
Spring. 3 credits. Not offered 2001–2002. K. Haines-Eitzen.
For description, see NES 295.]

[RELST 299 The Hebrew Bible and the Arabic Qur'an in Comparative Perspective (also NES 299, COM L 299, JWST 299)
Spring. 3 credits. Not offered 2001–2002. R. Brann.
For description, see NES 299.]

RELST 306 Zen Buddhism (also ASIAN 306)
Spring. 4 credits. J. M. Law.
See ASIAN 306 for description.

RELST 313 Classical Arabic Texts (also NES 313)
Fall. 4 credits. D. Powers.
For description, see NES 313.

[RELST 315 Medieval Philosophy (also PHIL 315)
Spring. 4 credits. Not offered 2001–2002. S. MacDonald.
For description, see PHIL 315.]

[RELST 318 Introduction to the Hebrew Bible—Seminar
Fall. 1 credit. Not offered 2001–2002. G. Rendsburg.
For description, see NES 325.]

RELST 319 Spenser and Malory (also ENGL 321)
Spring. 4 credits. C. Kaske.
For description, see ENGL 321.

RELST 320 Myth, Ritual, and Symbol (also ANTHR 320)
Spring. 3 or 4 credits. D. Holmberg.
For description, see ANTHR 320.

RELST 321 Heresy and Orthodoxy in Early Christianity (also NES 321)
Spring. 4 credits. K. Haines-Eitzen.
For description, see NES 321.

[RELST 322 Magic, Myth, Science, and Religion (also ANTHR 322)
Fall. 4 credits. Not offered 2001–2002.]

[RELST 323 Reinventing Biblical Narrative Apocrypha and Pseudepigrapha (JWST 323, NES 323)
Spring. 4 credits. Not offered 2001–2002. K. Haines-Eitzen.
For description, see NES 323.]

RELST 326 Christianity and Judaism (also COM L 326)
Spring. 4 credits. C. M. Carmichael.
For description, see COM L 326.

RELST 328 Literature of the Old Testament (also COM L 328)
Fall. 4 credits. C. Carmichael.
For description, see COM L 328.

[RELST 329 Introduction to the New Testament Seminar (also NES 329, JWST 329)
Fall. 1 credit. Prerequisite: concurrent enrollment in RELST 229 and one year of ancient Greek. Not offered 2001–2002. K. Haines-Eitzen.
For description, see NES 329.]

[RELST 330 Gnosticism and Early Christianity (also NES 328, JWST 328)
Spring. 4 credits. Not offered 2001–2002. K. Haines-Eitzen.
For description, see NES 328.]

RELST 332 Medieval Architecture (also ART H 332, ARCH 382)
Fall. 4 credits. R. G. Calkins.

RELST 333 Greek and Roman Mystery Cults and Early Christianity (also CLASS 333)
Fall. 4 credits. K. Clinton.

RELST 334 Islamic Spain: Culture and Society (also NES 339/639, JWST 339, COM L 334, SPAN L 339/639)
Fall. 4 credits. R. Brann.
For description, see NES 339.

[RELST 336 Prelude to the Italian Renaissance (also ART H 336)
Fall. 4 credits. Not offered 2001–2002. R. G. Calkins.
For description, see ART H 336.]

RELST 337 The Medieval Illuminated Book (also ART H 337)
Fall. 4 credits. R. G. Calkins.

[RELST 339 Power, Piety, and Medieval Art (also ART H 330)
Fall. 4 credits. Not offered 2001–2002. L. Jones.
For description, see ART H 330.]

[RELST 340 Byzantine Theocracy: Fourth to Eighth Century (also CLASS 335)
Fall. 3 credits. Not offered 2001–2002. S. Wessel.
For description, see CLASS 335.]

[RELST 345 Intellectual and Cultural Life of Nineteenth Century Americans (also HIST 345, AM ST 345)
Spring. 4 credits. Not offered 2001–2002. R. L. Moore.
For description, see HIST 345.]

[RELST 347 Tantric Traditions (also ASIAN 347)
Fall. 4 credits. Not offered 2001–2002. D. Gold.
For description, see ASIAN 347.]

[RELST 348 Indian Devotional Poetry (also ASIAN 348)
Fall. 4 credits. Not offered 2001–2002. D. Gold.
For description, see ASIAN 348.]

[RELST 350 Law, Society, and Culture (also NES 351/651, HIST 372/652)
Fall. 4 credits. Not offered 2001–2002. D. Powers.]

RELST 351 The Religious Traditions of India (also ASIAN 351)
Fall. 4 credits. D. Gold.

[RELST 354 Indian Buddhism (also ASIAN 354)
Fall. 4 credits. Not offered 2001–2002. C. Minkowski.]

[RELST 355 Japanese Religions: A Study of Practice (also ASIAN 355)
Fall. 4 credits. Not offered 2001–2002. J. M. Law.]

RELST 356 Islamic Law and Society (also NES 357)
Spring. 4 credits. D. Powers.
For description, see NES 357.

[RELST 359 Japanese Buddhism (also ASIAN 359)
Spring. 4 credits. Not offered 2001–2002. J. M. Law.]

[RELST 362 The Culture of the Renaissance II (also COM L 362, ENGL 325, HIST 364, ART H 351, MUSIC 390)
Fall. 4 credits. Not offered 2001–2002. W. J. Kennedy.
For description, see COM L 362.]

[RELST 366 Medieval Culture, 1100–1300 (also HIST 366)
Fall. 4 credits. Not offered 2001–2002. J. J. John.
For description, see HIST 366.]

[RELST 368 Marriage and Sexuality in Medieval Europe (also HIST 368, WOMNS 368)
Spring. 4 credits. Not offered 2001–2002. P. Hyams.
For description, see HIST 368.]

[RELST 371 A Mediterranean Society and Its Culture: The Jews under Classical Islam (also COM L 371, NES 371, JWST 371)
Spring. 4 credits. Not offered 2001–2002. R. Brann.
For description, see NES 371.]

RELST 381 Anthropology and Religion (also ANTHR 381)
Spring. 4 credits. A. Willford.
See ANTHR 381 for description.

[RELST 393 Religion and Politics in the Middle East (also NES 393)
Fall. 4 credits. Not offered 2001–2002.]

RELST 394 Gender, Sexuality, and the Body in Early Christianity (also NES 394, WOMNS 394)
Spring. 3 credits. K. Haines-Eitzen.

[RELST 395 Classical Indian Philosophical Systems (also ASIAN 395, CLASS 395)
Fall. 4 credits. Not offered 2001–2002. C. Minkowski.]

[RELST 400 Tibetan Buddhism (also ASIAN 400)
Fall. 4 credits. Enrollment limited to 20 students and instructor consent. Not offered 2001–2002. J. M. Law.
For description, see ASIAN 400.]

RELST 401 The Soul in Medieval Culture (also S HUM 401, HIST 404)
Fall. 4 credits. R. Ziomkowski.
For description, see S HUM 401.

[RELST 407 Religion and Human Rights (also ASIAN 407)
Spring and summer. 4 credits. Not offered 2001–2002. J. M. Law.
For description, see ASIAN 407.]

RELST 409 Seasons of Migration (also JWST 409, NES 409, S HUM 409)
Fall. 4 credits. S. Toorawa.
See S HUM 409 for description.

RELST 410 Latin Philosophical Texts (also PHIL 410)
Fall and spring. Variable credit. Prerequisite: knowledge of Latin and permission of instructor. S. MacDonald.
For description, see PHIL 410.

RELST 420 Readings in the Hebrew Bible (also NES 420, JWST 420)
Fall. 4 credits. R. Brann.
For description, see NES 420.

[RELST 421 Readings in Biblical Hebrew Poetry (also NES 421, JWST 421)
Fall. 4 credits. Prerequisite: one year of Biblical or Modern Hebrew. Not offered 2001–2002. G. Rendsburg.
For description, see NES 421.]

RELST 427 Biblical Seminar (also COM L 428)
Fall. 4 credits. C. Carmichael.
For description, see COM L 428.

RELST 429 Adam's Rib and other Divine Signs: Reading Biblical Narrative (also ENGL 429)
Spring. 4 credits. L. Donaldson.
See ENGL 429 for description.

[RELST 442 Religion and Politics in American History (also HIST 442)
Fall. 4 credits. Not offered 2001–2002. R. L. Moore.]

[RELST 443 Religion and Ritual in Chinese Society and Culture (also ANTHR 443)
Fall. 4 credits. Not offered 2001–2002. S. Sangren.]

RELST 449 History and Methods of the Academic Study of Religion (also ASIAN 449)
Spring. 4 credits. Required of Religious Studies majors. D. Gold.
For description, see ASIAN 449.

RELST 460 Indian Meditation Texts (also ASIAN 460)
Fall. 4 credits. D. Gold.
For description, see ASIAN 460.

RELST 490–491 Directed Study
490, fall; 491, spring. 2–4 credits each term. For majors in Religious Studies; permission of director required. Staff.

RELST 495 Senior Honors Essay
Fall and spring. Variable up to 8 credits. Required for honors in Religious Studies. Staff.

RELST 531 Problems in Medieval Art and Architecture (also ART H 531)
Spring. 4 credits. R. G. Calkins.
For description, see ART H 531.

Additional courses offered by cooperating departments may also be approved through petition for the major in Religious Studies. For details see the program director, Jane Marie Law, 125 Rockefeller Hall or e-mail her at jml16@cornell.edu.

Science of Earth Systems

The full faculty of the Department of Earth and Atmospheric Sciences (see page 448) plus the following: W. Brutsaert (civil and environmental engineering); P. Gierasch (astronomy); M. Kelley (electrical engineering); J.-Y. Parlange (agricultural and biological engineering); J. Yavitt (natural resources).

The Science of Earth Systems (SES) is the study of the interactions among the atmosphere, oceans, biosphere, and solid Earth; these dynamic interactions control the global environment. The interdisciplinary, basic science approach of SES incorporates major components of geology, ocean and atmospheric sciences, terrestrial hydrology, biogeochemistry, and ecology into an integrated study of Earth as a complex system. Earth system science presents one of the outstanding intellectual challenges in modern science and is the primary foundation for the future management of our home planet.

The Major

The major in Science of Earth Systems emphasizes a rigorous, objective study of the Earth and its systems with broad preparation in basic sciences and mathematics, followed by the choice of an area of concentration for study in greater depth. The Science of Earth Systems program seeks to train students in a strong set of fundamental skills that will allow them to approach with quantitative rigor a wide range of questions about the Earth and its environment, and to adapt those skills rapidly to new areas of inquiry as they arise. The major in Science of Earth Systems is by nature interdisciplinary, and involves faculty from the College of Arts and Sciences, the College of Engineering, and the College of Agriculture and Life Sciences. In the College

of Arts and Sciences the program is administered by the Department of Earth and Atmospheric Sciences in collaboration with the Departments of Astronomy, and Ecology and Evolutionary Biology.

The SES curriculum begins with a series of courses designed to provide preparation in fundamental science and mathematics necessary for a rigorous study of Earth Systems. This preparation is followed by three SES core courses providing breadth and integration. An additional set of four intermediate to advanced courses is selected to provide depth and a degree of specialization.

Students in the College of Arts and Sciences choosing to pursue the Science of Earth Systems major are required to take the following courses: PHYS 207–208 (or 112–213), CHEM 207–208, BIOSCI 101/103–102/104 (or 109–110), and MATH 111–112 (or 121–122, or 190/191–192). Three additional 3–4 credit hour courses in mathematics, physics, chemistry, or biology are required; these additional courses must require one or more of the basic courses listed above as a prerequisite. One of the courses must be either EAS 201 or BIOES 261. Both EAS 201 and BIOES 261 can be chosen. Mathematics at the level of MATH 221 or 293 is strongly recommended for all SES students, and those choosing areas of concentration in Atmospheric Sciences, Environmental Geophysics, or Hydrology should take MATH 222 or 294.

The three required SES core courses include the following:

EAS 331/ASTRO 331 Climate Dynamics

EAS 302 Evolution of the Earth System

EAS 321/NTRES 321 Introduction to Biogeochemistry

Four additional 3–4 credit classes selected from 300- and 400-level courses, approved for an SES concentration, are required. These courses will ordinarily be organized around one of the SES areas of specialization. Areas of specialization include, but are not limited to, the following: Climate Dynamics, Ocean Science, Environmental Geology, Environmental Biophysics, Biogeochemistry, Soil Science, Ecological Systems, Hydrological Science.

Further information and applications contact Kerry H. Cook, khc6@cornell.edu. Also see the SES web site at **www.eas.cornell.edu** for up-to-date information. Administrative offices are located at 2122 Snee Hall.

Society for the Humanities

Dominick LaCapra. Director

Fellows for 2001–2002

Avtar Brah (University of London)

Ross Brann (Cornell University)

Debra Castillo (Cornell University)

Vitaly Chernetsky (Columbia University)

Elizabeth Deloughrey (Cornell University)

Francois Jullien (Université Paris 7)

Michael Kammen (Cornell University)

Tracy McNulty (Cornell University)

Viranjini Munasinghe (Cornell University)

John Noyes (University of Cape Town)

Zita Nunes (University of Maryland)

Julia Offen (Calgary Institute for the Humanities)

Gary Peatling (University of Wales, Aberystwyth)

Sandhya Shukla (Columbia University)

Michael Steinberg (Cornell University)

Shawkat Toorawa (Cornell University)

Robert Ziomkowski (Pontifical Institute of Mediaeval Studies)

The Society annually awards fellowships for research in the humanities. The Fellows offer, in line with their research, informal seminars intended to be exploratory or interdisciplinary. These seminars are open to graduate students, suitably qualified undergraduates, and interested auditors. Students who want credit for a seminar should formally register in their own college. Persons other than those officially enrolled may attend as visitors with permission of the Fellow. The theme for 2001–2002 is "Diaspora and the Critical Imagination".

S HUM 401 The Soul in Medieval Culture (also HIST 404 and RELST 401)
Fall. 4 credits. Limited to 15 students. R 12:20–2:15. R. Ziomkowski.
This course studies the medieval reception of mythological themes in Plato's philosophy, particularly the world-soul and the transmigration of souls, as these appear in the *Timaeus* (the only dialogue of Plato known in the Latin West throughout the Middle Ages). In focusing on the nature of the soul, we study the tension between theology and philosophy concerning a doctrine of central importance to medieval Christian culture, as well as one that the ancient world had developed to a high degree of sophistication. We look at texts written during the first thirteen centuries of the Christian era, with particular emphasis on the twelfth century. The course is conducted as intellectual history, inasmuch as we study the reception of Plato's *Timaeus* across time and across a range of literary genres (dialogues, theological treatises, cosmological compendia, poetry), with particular attention to works of Menippean satire such as Boethius' *Consolation of Philosophy*, Bernardus Silvestris' *Cosmographia*, and Alan of Lille's *Plaint of Nature*. Theoretical perspectives are drawn from works of literary criticism, particularly from Mikhail Bakhtin's theories of Menippean satire. All texts are read in translation, although the ability to read Latin may broaden one's research options.

S HUM 402 Democracy and the City (also ASIAN 428)
Fall. 4 credits. Limited to 15 students. M 2:30–4:25. F. Jullien.
Approaching the subject as a philosopher and a sinologist, we deal primarily with Greece and Ancient China. In adopting this dual approach, the seminar illustrates the difference between their ways of thinking and leads to an examination of what constitutes the essence of the city in the West and of the strong link between the city, the form of democracy, and the ideal of liberty. It concludes with a consideration of the contemporary obliteration of the city-as instanced in today's East Asian megalopolises-and, in light of this, poses the question of the future of democracy itself.

S HUM 403 After Immigration (also LSP 403 and SPANL 403)
Spring. 4 credits. Limited to 15 students. R 2:30–4:25. D. Castillo.
Beginning with a close reading of Michael Jones-Correa's seminal study of Latinos in New York, *Between Two Nations*, we focus class discussion on recent Latin American immigration to the United States through two complementary perspectives and meditations on the immigrant experience: that of the individuals who have arrived in the US, and that of individuals who have chosen to remain in the countries of origin. The class studies films like *Nueva Yol* and *Jardin de Edén*, Latin American authors like Carlos Fuentes, Ana Lydia Vega, and Ariel Dorfman, and US Latinos like Julia Alvarez, Francisco Goldman, and Cristina Garcia. Students are encouraged to do individually-tailored research projects that may include autobiographical or ethnographic elements as well as literary analysis and theoretical inquiries.

S HUM 404 Displacement, Desire, Identity (also RUSSL 403)
Fall. 4 credits. Limited to 15 students. T 12:20–2:15. V. Chernetsky.
This seminar focuses on the ways in which authors whose backgrounds tie them to a part of the world that served as a source of several major waves of diasporic displacement over the past century—East Central Europe and the former Russian/Soviet empire—reflected on displacement and the diasporic experience. In particular we focus on their impact on the construction and performance of identities and on manifestations of desire. We explore these experiences from the mass emigration from the Russian and Austro-Hungarian empires in the years preceding their collapse and the concomitant revolutions and civil wars, to the continuous waves of refugees and displaced persons as a result of the revolutions, civil wars, the two world wars, and most recently the collapse of the "communist" regimes and the implosion of Yugoslavia. We consider how these experiences impacted the construction and performance of such aspects of identity as nationhood, age, gender, and sexuality. Readings include selections from the fiction, diaries, essays, and poetry by Joseph Conrad, Vladimir Nabokov, Witold Gombrowicz, Yuri Andrukhovych, Dubravka Ugresic, and others. The seminar endeavors to bring this discourse into a dialogic contact with its counterparts in contemporary postcolonial studies and feminist scholarship.

S HUM 405 The Four Seasons Motif in American Culture (also HIST 455 and AM ST 430.2)
Fall. 4 credits. Limited to 15 students. Permission of instructor. M 2:30–4:25. M. Kammen.
The focus of this seminar is one of the most ubiquitous and pervasive motifs in all of the arts (painting, literature, and music) in the Northern Hemisphere, both West and East: The Four Seasons. We view works of art and films, read fiction, non-fiction, and poetry, and listen to music. Although we must devote serious attentions to the Old World origins, dispersion, and local permutations of this motif, more than half of the seminar is given over to American manifestations and writings about the seasons, with particular attention to changes over time as well as geographical variations.

S HUM 406 Biblical Diasporas in France (also COM L 488 and FRLIT 406)
Fall. 4 credits. Limited to 15 students. F 12:20–2:15. T. McNulty.
This course examines the use of the concept of "diaspora" in contemporary French thought, considering how such notions as deterritorialization, homelessness, the uncanny, and the "ungrounding" of identity. We focus our attention on a group of authors whose uses and adaptations of the concept of "diaspora" are heavily indebted to theologies such as Judaism and mysticism. Can we locate in modern philosophy the "diaspora" of a certain kind of theological thought? What is its relationship to the philosophical discourse in which it takes up residence? The first part of the course considers the problems of estrangement, nomadism, and diaspora in the Bible, examining how the Hebrew patriarchs, Jewish prophets, and Christian apostles use these themes to define their position with regard to God and their different attitudes toward the law, the word, and the book. We then explore how these themes are developed in works by Blanchot, Buber, Deleuze, Derrida, Lévinas, Lyotard, Scholem and Rosenzweig. Students may read all works in the original languages or in translation.

S HUM 408 Jewish Culture and Modernity (also HIST 405, JWST 408, GERST 420)
Fall. 4 credits. Limited to 15 students. M 2:30–4:25. M. Steinberg.
With an emphasis on Germany but with materials drawn also from England, France, and the United States, this seminar analyzes the intersections and mutual production of modern Jewish culture and general structures and discourses of modernity. It takes up the category of "Jewish culture" as distinct from "Judaism," as the focus is less on a religious tradition than on a cultural and historical identification whose sacred/secular boundaries are fluid and contestable. Thus, the boundaries between the sacred and the secular become a central debate both within Jewish culture and its multiple, mutual refractions with the non-Jewish world, which may itself be constituted in terms of modern nationalities, as Christian, secular, or anti-Semitic.

S HUM 409 Seasons of Migration (also NES 409, RELST 409, and COM L 499)
Fall. 4 credits. Limited to 15 students. R 2:30–4:25. S. Toorawa.
Muslim Literature and Film of the Diasporic Imagination. How and where does—indeed, can—one write the story of a diaspora of the Muslim creative and critical imagination? How do contemporary diasporic Muslim writers and filmmakers operate with(in) memory, with the impossible longing to belong, with the loss of 'home' (when 'home' is where they already are…?) Guided by the critical work of Ahmed, Erickson, Hawley, Rushdie, and Subramani, we read the works of Sohaila Abdulali, Zulfikar Ghose, Abdulrazak Gurnah, Aamer Hussein, Farida Karodia, Adib Khan, Waqas Ahmad Khwaja, Hanif Kureishi, Yasmin Ladha, and others; and watch *Bhaji on the Beach*, *Masala*, *My Beautiful Launderette*, *Surviving Sabu*, and other films made in Britain and North America. We critique, evaluate, and enjoy these works through the lens of the diasporic condition, by paying special attention to the effects of displacement and its impact on articulations of faith, history, identity, memory, mythologies, nation(alism), subjugation, the postmodern, and the (post)postcolonial. We try to understand how the 'expatriate' Muslim writes herself, her world, and her condition.

S HUM 410 The Transoceanic Imagination (also ENGL 401/601)
Fall. 4 credits. Limited to 15 students. T 2:30–4:25. E. Deloughrey.
This course focuses on diasporan literatures of "crossing the water" and examines the historical, political and social factors that shape the inscriptions of these journeys. Since the etymological root of "diaspora" derives from the scattering of male "seed," we examine the gendering of dispersal narratives of Atlantic and Pacific travellers including seamen, pirates, missionaries, slaves and sailors in order to interrogate the relationship of primarily male shipboard communities to nationalism, gender, sexuality, diaspora and resistance. We pay particular attention to the material and gendered divisions between public and private both on the ship and in relation to its various ports. We cover diverse travel itineraries in our efforts to understand the relationship between travellers and place and to examine the consequences of destabilizing territorial, ethnic, and national identities. Readings may include works by Mary Seacole, Édouard Glissant, Antonio Benítez-Rojo, J. S. Kanwal, Albert Wendt, and Derek Walcott.

S HUM 411 Performing Community
Fall. 4 credits. Limited to 15 students. W 2:30–4:25. J. Offen.
This seminar explores imaginations, performances, and experiences of "community" in the European/American Circus world and other cultural performances. We examine collective identities (gender, ethnicity, race, nationality, class, sexuality, community, and others) and inequalities as they are expressed and negotiated through public culture and discourse. We consider critical social theories, representations in popular culture, and ethnographic explorations. Requirements include active participation, critical short essays, and a final creative project.

S HUM 415 Creolization, Syncretism, Hybridity (also ANTHR 415)
Spring. 4 credits. Limited to 15 students. T 10:10–12:05. V. Munasinghe.
The concepts Creolization, Hybridity, and Syncretism all convey a state of 'mixture.' This course explores theories and empirical case studies of processes of racial, cultural and religious mixture from an inter-disciplinary perspective. The course explores the interconnections among concepts denoting 'mixture' that have diverse originary points. The overarching line of inquiry is to explore the genealogies of the three concepts as a necessary precursor to understanding how these terminologies may, in concert, illuminate different aspects of the dynamic structuring processes of mixture in different historical and ethnographic settings. More specifically this course asks how ideologies of mixture articulate with nationalist and ethnic ideologies. Do sites of mixture afford possibilities for alternative nationalist imaginings that undermine the homogenizing logic of nation-building? Do ideologies of mixture necessarily deny the existence of essentialisms, and if so what are the political implications for peoples embodying 'mixture' in this historical moment when identity politics in multi-cultural nation states presume essentialist identities? Why are some diasporic groups represented as suitable for mixture but not others? And what are the socio/political/economic consequences of such representations? These are some of the questions this course addresses through an examination of not only specific empirical case studies but also interdisciplinary theorizations of the three concepts. The aim of this course is to critically engage various theorizations of 'mixture' both in relation to one another and in relation to specific empirical situations in order to conceptualize processes of mixture that build on but also go beyond the insights generated by these three concepts.

S HUM 418 Racial Democracy in the Americas (also ENGL 418/613 and COM L 432)
Spring. 4 credits. Limited to 15 students. T 12:20–2:15. Z. Nunes.
This course addresses democracy and its capacity for representing various racial positions in the Americas. We discuss national and transnational identities defined according to concepts of mixture and to a politics of democracy and inclusion including: anthropophagism, mestizaje, créolité, transculturation, multiculturalism and hybridity. Readings are drawn from literary and theoretical texts.

S HUM 419 Modern Nomads (also GERST 419)
Spring. 4 credits. Limited to 15 students. T 12:20–2:15. J. Noyes.
Nomadism has always been an issue that reminded sedentary cultures of their opposite, their outside, their failure to control the world in its entirity. And yet, sedentary and nomadic cultures have always enjoyed an ambivalent relationship, and this in turn marks the fictions of modernity in decisive ways. This is particularly evident in German culture, where issues of imperialism and territoriality were constantly displaced from the political to the cultural arena. Fictional and critical texts play a key role in this process, since they stake out the imaginary dimensions of subjectivity in relation to culture and territory. In this seminar we will examine how, in the wake of Enlightenment, German cultures of modernity attempted to negotiate the ambivalence of nomadic mobility. We analyse key fictional and critical texts chosen from moments in German history when mobility and territoriality were particularly important in the public imagination.

S HUM 420 Cross-culturality in the Caribbean (also ANTHR 410)
Spring. 4 credits. Limited to 15 students. W 2:30–4:25. S. Shukla.
This seminar takes as its inspiration the literary and sociopolitical imaginary of Guyanese writer Wilson Harris, described as "cross-culturality." Here, the model of diversity being elaborated is rather different from the multiculturalism we are familiar with, in the United States (or Britain or Canada, for that matter), where cultures are seen to function as discrete parts of the whole. Cross-culturality presumes that individual ethnic or racial cultures are partial and reinvent themselves through dialogues with other cultures. Perhaps this broad and flexible conception can only emerge from the Caribbean, a hyper-theorized space of hybridity. But is this because the constitutive ideas, of race, nation, and migration, are different in West Indian countries from those that operate in the North American context? Can they be traced historically, in relation to political develop-

ments, of colonialism, postcolonialism and regionalism? And what happens to these concepts when they move across the border of the nation-state?

S HUM 421 Contexts of Irish Diaspora
Spring. 4 credits. Limited to 15 students. T 10:10–12:05. G. Peatling.
The aim of this seminar is to encourage examination of the uses of the concept of "diaspora" through a critical contextualisation. This is attempted principally in relation to Irish diaspora communities in the United Kingdom and the United States, but comparative perspectives and observations are encouraged.

S HUM 423 Culture, Identity, and Diaspora
Spring. 4 credits. Limited to 15 students. R 12:20–2:15. A. Brah.
This seminar explores theoretical and substantive issues raised by the debates surrounding identity, difference, and diaspora. It examines the use of these concepts in the work on 'intersectionality' of racism, class, ethnicity, gender, and sexuality. The course draws upon material from Britain, continental Europe, and North America, with a significant focus on feminist work. We address questions of difference, diversity and differentiation; identification and subjectivity; and, those of solidarity and social transformation. How do questions of 'national' belonging differ in Europe as compared with settler societies such as that of the United States? What effects has 'differential racialisation' of groups such as African, South Asian, Irish, and Jewish descent groups in Britain and the United States had on questions of identity, inequity and inequality? What impact have diasporas made on transforming our sense of 'local' and 'global' relations?

S HUM 459 Opera, History, Politics, Gender (also WOMNS 454, COM L 459, HIST 460, MUSIC 474, ITALL 456)
Spring. 4 credits. M. Steinberg and S. Stewart.
See HIST 460 for full course description.

South Asia Program

C. Minkowski, director; A. Basu, K. Basu, D. Bor, D. Boucher, L. Derry, M. Farooqi, S. Feldman, D. Gold, M. Hatch, D. Henderson, R. Herring, D. Holmberg, R. Kanbur, M. Katzenstein, V. Kayastha, K. A. R. Kennedy, S. Kuruvilla, M. Latham, B. Lust, B. MacDougall, M. Majumdar, K. March, K. McGowan, S. Mohanty, V. Munasinghe, A. Nussbaum, S. Oja, P. Olpadwala, B. Perlus, T. Poleman, C. Salomon, N. Sethi, D. Sisler, S. Subramanian, J. Toorawa, N. Uphoff, M. Walter, M. Weiss, A. Wilford.

The South Asia Program coordinates research, teaching, and special campus events relating to Bangladesh, India, Pakistan, Nepal, and Sri Lanka. The program faculty include members from a variety of disciplines, including agricultural economics, agricultural engineering, anthropology, architecture, art, city and regional planning, comparative religion, ecology and systematics, economics, English, geology, government, history, history of art, human ecology, industrial and labor relations, international agriculture, linguistics, literature, and rural sociology. Undergraduates with a special interest in the region may major in Asian Studies with a South Asia concentration, or complete a South Asia concentration with any other major. Graduate students may pursue the M.A. degree in Asian Studies with a concentration in South Asia.

Languages offered are Bengali, Hindi, Nepali, Sinhala, and Sanskrit. Foreign Language and Area Studies scholarships are available to graduate students who are U.S. citizens or permanent residents. Cornell is a member of the American Institutes of Bangladesh, Indian, Pakistan, and Sri Lankan studies. For details on the major, see the Department of Asian Studies listing in this volume. For courses available in South Asian studies, or for further information on research opportunities, direct questions to the South Asia Program Office, 170 Uris Hall.

Southeast Asia Program

T. Chaloemtiarana, director; B. R. Anderson, I. Axis, W. B. Bailey, A. C. Cohn, P. Gellert, M. F. Hatch, S. Kuruvilla, T. Loos, K. M. McGowan, A. Riedy, J. T. Siegel, E. Tagliacozzo, K. W. Taylor, L. Williams, J. U. Wolff, D. K. Wyatt, Emeritus: R. Baker, R. B. Jones, G. McT. Kahin, S. J. O'Connor, Lecturers: N. Jagacinski, T. Tranviet, S. Tun

Southeast Asia studies at Cornell is included within the framework of the Department of Asian Studies. Seventeen core faculty members in the colleges of Arts and Sciences, Business and the Johnson Graduate School of Management, the School of Industrial and Labor Relations, and Agriculture and Life Sciences participate in an interdisciplinary program of teaching and research on the history, culture, and societies of the region stretching from Burma through the Philippines. Courses are offered in such fields as anthropology, Asian studies, economics, finance, government, history, history of art, labor relations, linguistics, music, and rural sociology. Instruction is also offered in a wide variety of Southeast Asian languages; Burmese, Cambodian (Khmer), Cebuano (Bisayan), Indonesian, Javanese, Tagalog, Thai, and Vietnamese, for which Foreign Language Area Studies Fellowships are available to U.S. citizens. In addition, faculty from other disciplines also provide area instruction on Southeast Asia. The formal program of study is enriched by a diverse range of extracurricular activities, including an informal weekly brown bag seminar, art exhibits at the Johnson Museum, and concerts of the Gamelan Ensemble. The George McT. Kahin Center for Advanced Research on Southeast Asia is also the site for public lectures as well as publication and outreach activities related to this area. The John M. Echols Collection on Southeast Asia, in Kroch Library, is the most comprehensive collection on this region in America.

Undergraduates may major in Asian studies with a focus on Southeast Asia and its languages, or they may elect to take a concentration in Southeast Asia studies with any other major by completing 18 credits of course work. Graduate students may work toward an M.A. degree in Southeast Asian studies or pursue a Master of Professional Studies in another school with a concentration in Southeast Asian studies. Ph.D. students specializing in Southeast Asia receive a doctorate in a discipline such as history, history of art, anthropology, government, music, economics, or city and regional planning.

For courses available in Southeast Asian studies and details on the major, see the Department of Asian Studies listing in this volume. Additional information is available on the Internet at: www.einaudi.cornell.edu/southeastasia. Inquiries for further information should be directed to the program office, 180 Uris Hall, (607) 255-2378 or SEAP@cornell.edu.

Statistical Science Department

The university-wide Department of Statistical Science coordinates undergraduate and graduate study in statistics and probability. A list of suitable courses can be found in the section, "Interdisciplinary Centers, Programs, and Studies," in the front of this catalog.

Visual Studies Concentration

Visual Studies is a concentration that provides students with an interdisciplinary approach to visual art, media (including digital works), performance, and perception. Faculty from departments throughout the college offer courses toward the concentration, drawing on such various disciplines as the history of art, film, literary studies, psychology, theatre, and others. Requirements for the concentration include selection of one from two possible core courses (the two core courses may be offered in tandem or on an alternating basis depending on the availability of staff), which introduce students to critical thinking about visual studies as well as close textual analysis in social and historical contexts. Responsibility for teaching the core course will rotate among faculty affiliated with the concentration, and the course will, as much as possible, entail interdepartmental collaboration in the form of team-teaching or visiting lectures. In addition to the core course, students must choose four Cornell courses from among the different categories of courses offered in the concentration. One of the four courses must include a significant component of practical work (such courses are listed under the category "Theory/Practice"). No more than two courses from the concentration may be double- counted toward a student's major. All courses must be taken for a letter grade.

Students interested in pursuing the concentration should discuss it with their advisers, and then contact the director of the concentration. The director will register students in the concentration and assign each student an adviser selected from among the concentration's affiliated faculty. Advisers should forward a copy of each advisee's transcript to the director, indicating courses completed for the concentration.

Director and Affiliated Faculty

Director, Brett de Bary, Asian Studies and Comparative Literature

Affiliated Faculty:

Robert Ascher, Anthropology

David Bathrick, Theatre, Film, and Dance

Robert Bertoia, Art

Susan Buck-Morss, Government

Robert G. Calkins, History of Art

James Cutting, Psychology
David Field, Psychology
Donald Fredericksen, Theatre, Film, and Dance
Werner Goehner, Architecture
Jacqueline Goldsby, English
Salah Hassan, Africana Studies
Ellis Hanson, English
Marcia Lyons, Art
Laura Meixner, History of Art
Kaja McGowan, History of Art
Timothy Murray, English
Marilyn Rivchin, Theatre, Film, and Dance
Rebecca Schneider, Theatre, Film, and Dance
Michael Steinberg, History
Amy Villarejo, Theatre, Film, and Dance
Geoff Waite, German Studies

Visual Studies Concentration Course List

1. Core Course for 2000–2001

VISST 200 Introduction to Visual Studies (IV)
Spring. 4 credits. Requirements: two objective midterm exams; occasional listserve postings; two five page papers. T. Murray.
Introduction to Visual Studies will provide a broad introduction of modes of vision and the historical impact of visual images, visual structures, and visual space on culture, communication, and politics. The question of "how we see" will be discussed in terms of (1) procedures of sight (from optical machines to the psychology of vision and the philosophy of aesthetics); (2) spaces of vision (from landscapes to maps to cities); (3) objects of vision (from sacred sites to illuminated books to digital art); and (4) performances of vision (race, sexualities, ethnicities, cultures). Of importance to the course will be the practical and conceptual relation of twentieth-century visual technologies (photography, cinema, video, and computing) to their historical corollaries in the arts.

The course will draw on the visual traditions of both Western and non-Western societies and study texts that have defined the premises and analytic vocabularies of the visual. Through viewings, screenings, collaborative writing, and art projects, students will develop the critical skills necessary to appreciate how the approaches that define visual studies complicate traditional models of defining and analyzing art objects. Guest lecturers will occasionally address the class.

2. New Media

ANTHR 291/691 Filming Other Cultures (also THETR 291/691)
Spring. R. Ascher.

[ASIAN 313 Japanese and Asian Film
Not offered 2001–2002. B. de Bary.]

ASIAN 415 Virtual Orientalisms (also COM L 418)
Spring. B. de Bary.

AS&RC 435 African Cinema
Fall. S. Hassan.

ENGL 369 Fast-Talking Dames and Sad Ladies (also WOMNS 369 and THETR 367)
Fall. L. Bogel.

[ENGL 660 Cinematic Desire (also THETR 661)
Not offered 2001–2002. E. Hanson.]

[FRLIT 336 French Film
Spring. Not offered 2001–2002. T. Murray.]

[GERST 396 German Film
Not offered 2001–2002. D. Bathrick.]

[GERST 449 Re-Screening the Holocaust (also THETR 450, COM L 453)
Spring. Not offered 2001–2002. D. Bathrick.]

SPANL 399 Spanish Film
Fall. J. R. Resina.

THETR 274 Introduction to Film Analysis: Meaning and Value
Fall. D. Fredericksen.

[THETR 378 Soviet Film of the 1920s and French Film of the 1960s
Spring. Not offered 2001–2002. D. Fredericksen.]

THETR 376 History and Theory of Documentary and Experimental Film
Fall. A. Villarejo.

[THETR 386 Third Cinema
Not offered 2001–2002. A. Villarejo.]

[THETR 269 Interpreting Hitchcock (also THETR 264)
Fall. Not offered 2001–2002. L. Bogel.]

THETR 369 Fast-Talking Dames and Sad Ladies (also WOMNS 369 and THETR 367)
L. Bogel.

[THETR 395/ENGL 395 Video: Art, Theory, Politics
Fall. Not offered 2001–2002. T. Murray.]

WOMNS 405 Domestic Television
Spring. A. Villarejo.

3. Interdisciplinary, Intermedia Studies

[AM ST/HIST/ART H 430 America in the Camera's Eye
Fall. Not offered 2001–2002. L. Moore.]

[ART H 337 Medieval Illuminated Book
Not offered 2001–2002. R. Calkins.]

[ART H 531 Archaeology of the Book: Narrative in Medieval Illustrated Books
Spring. Not offered 2001–2002. R. Calkins.]

[ART H 580 Problems in Asian Art: The Subtle Body
Not offered 2001–2002. K. McGowan.]

EAS 200 Art, Archaeology, and Analysis (also GEOL 200, ARKEO 285, PHYS 200, ART H 200)
Spring. R. Kay.

MUSIC 410 Music and Monstrous Imaginings
Fall. A. Richards.

4. Perception, Cognitive Studies

BIONB 396 Introduction to Sensory Systems
Spring. B. Halpern.

[MATH 451 Geometry of Plane and Sphere
Spring. Not offered 2001–2002. D. Henderson.]

PSYCH 305 Visual Perception
Fall. J. Cutting.

PSYCH 342 Human Perception: Applications to Computer Graphics, Art, and Visual Display
Fall. D. Fields.

PSYCH 347 Psychology of Visual Communications
Spring. J. Maas.

[PSYCH/BIONB 492 Sensory Function
Spring. Not offered 2001–2002. B. Halpern.]

THETR 475 Seminar in the Cinema: Cognitive Film Theory
Fall. D. Fredricksen.
Topic for fall 2001: Narrative Technique in the New Hollywood.

5. Theory and Visuality

[ANTHR 453 Visual Anthropology
Not offered 2001–2002. R. Ascher.]

[ARCH 338/638 Postmodern Critical Texts
Not offered 2001–2002. W. Goehner.]

[ASIAN 388 Theorizing Race and Gender in East Asian Visual and Verbal Texts
Not offered 2001–2002. N. Sakai.]

[AS&RC 503 African Aesthetics (also, ART H 571)
Spring. Not offered 2001–2002. S. Hassan.]

[COM L 330 Political Theory and Cinema (also GERST 330)
Not offered 2001–2002. G. Waite.]

[COM L 367 Visual Culture and Social Theory (also, GOVT 376, ART H 370)
Fall. Not offered 2001–2002. S. Buck-Morss.]

[COM L 699 German Film Theory
Not offered 2001–2002. D. Bathrick.]

GERST 345/656 Aesthetic Theory: The End of Art (also COM L 656)
Fall. P. Gilgen.

[WOMNS 465 Feminist Theory/Lesbian Theory (also, GERST 465)
Not offered 2001–2002. A. Villarejo.]

6. Performance and Visuality

[ASIAN 410 Chinese Performing Arts
Fall. Not offered 2001–2002. E. Gunn.]

[ASIAN 471 Japanese Theater (also THETR 471)
Fall. Not offered 2001–2002. K. Brazell.]

[AS&RC African American Performance Genres and Traditions
Not offered 2001–2002. Staff.]

[THETR 319 Music, Dance, and Light
Fall. Not offered 2001–2002. E. Intemann, A. Fogelsanger.]

THETR 339 The Avant-Garde: Dead or Alive?
Spring. R. Schneider.

[THETR 403 Ritual, Play, Spectacle, Act: Performing Culture
Fall. Not offered 2001–2002. B. Schneider.]

THETR 445 Text Analysis for Production: How to Get From the Text onto the Stage
Fall. S. Cole.

7. Visuality and Society

ART H 360 Painting and Everyday Life in Nineteenth-Century America (also AM ST 360)
Spring. L. L. Meixner.

ART H 362 Impressionism in Society (also WOMNS 361)
Fall. L. Meixner.

[ART H 385 Representation and Meaning in Chinese Painting (also ASIAN 384)
Not offered 2001–2002. A.-Y. Pan.]

[ART H 395 The House and the World: Architecture of Asia (also ASIAN 394)
Spring. Not offered 2001–2002. K. McGowan.]

ART H 450 Representations of Women in the Italian Renaissance (also WOMNS 451)
Spring. C. Lazzaro.

[ART H 451 Prints and Visual Culture in Early Modern Europe
Not offered 2001–2002. C. Lazzaro.]

ART H 461 Art and Social Histories
Spring. L. Meixner.
Topic for spring 2002: Landscape as Ideology.

[ART H 462 Topics in Early Modernism
Not offered 2001–2002. L. Meixner.]

[ART H 481 Art of the T'ang Dynasty (also ASIAN 481)
Spring. Not offered 2001–2002. A.-Y. Pan.]

[ART H 490 Art and Collecting: East and West (also ASIAN 491)
Spring. Not offered 2001–2002. K. McGowan.]

[AS&RC 310 Art in African Culture and Society (also ART H 378)
Fall. Not offered 2001–2002. S. Hassan.]

[HIST 362 European Cultural History 1750–1870 (also COM L 352)
Fall. Not offered 2001–2002. M. Steinberg.]

HIST 363 European Cultural History 1870–1945 (also COM L 353)
Spring. M. Steinberg.

8. Theory/Practice

[ART 372 Art Show: Web Art
Fall and spring. Not offered 2001–2002. M. Lyons.]

[COGST 201 Cognitive Studies in Context Laboratory (also COM S 201 and PSYCH 201)
Fall, B. Halpern; spring, D. Field. Not offered 2001–2002.]

[COM S 417 Interactive Computer Graphics (also ARCH 374)
Spring. (Includes Practicum listed below; mostly oriented toward the visual arts.) Not offered 2001–2002. Staff.]

[COM S 418 Practicum in Computer Graphics
Spring. Not offered 2001–2002. Staff.]

DANCE 210 Beginning Dance Composition
Spring. J. Self.

DANCE 258 Techno Soma Kinesics I: Technology and the Moving Body
Spring. B. Suber.

DANCE 358 Techno Soma Kinesics II: the Moving Body and Technology
Spring. B. Suber.

[DANCE 418 Seminar in History of Dance: Digital Dance/Cyber Dance
Not offered 2001–2002. B. Suber.]

ENGL 164 Critical Surfing: Art and Culture on the World Wide Web
Fall. T. Murray.
Freshman Writing Seminar.

ENGL 434 Electronic Art and Culture
Fall. T. Murray.

MUSIC 104 Introduction to World Music: Asia
Spring. A. Warde.

MUSIC 245 Introducing Indonesia through Its Arts, Section III
Fall and spring. M. Hatch.

THETR 314 Western Dance History I
Fall. B. Suber.

THETR 310/311 Dance Composition (also THETR 410/411)
Fall. B. Suber.

THETR 335 Modern Western Drama, Modern Western Theater: Theory and Practice
Fall. R. Schneider.

THETR 339 Theories and Techniques of Twentieth-Century Performance (also, WOMNS 441)
Spring. B. Schneider.

THETR 362 Lighting Design Studio I
Fall. E. Intemann.

THETR/MUSIC/ART 391 Media Studio I and II (also listed as ARCH 459)
Fall. M. Rivchin, D. Borden, M. Lyons, J. Zissovic.

THETR 398 Fundamentals of Directing
Fall. D. Feldshuh.

[THETR 439 Theater of Commodities
Not offered 2001–2002. B. Schneider.]

THETR 462 Lighting Design Studio II
Spring. E. Inemann.

[THETR 477 Intermediate Film and Video Projects, Documentary and Experimental Workshop
Fall. Not offered 2001–2002. M. Rivchin.]

THETR 478 Intermediate Film and Video Projects: Narrative and Experimental Workshop
Fall. M. Rivchin.

THETR 493 Advanced Film and Video Projects
Spring. M. Rivchin.

Women's Studies Program

K. Abrams, A. Adams, P. Becker, D. Bem, S. Bem, A. Berger, L. Berneria, J. Bernstock, F. Blau, L. Bogel, M. Brinton, L. Brown, J. Brumberg, W. Burkard, L. Carrillo, D. Castillo, C. Chase, M. Clarkberg, D. Cohen, B. Correll, E. DeLoughrey, I. DeVault, M. Evangelista, J. Farley, S. Feldman, J. Fortune, N. Furman, J.E. Gainor, J. Ginsburg, W. Goldsmith, S. Greene, K. Haines-Eitzen, E. Hanson, N. Hirschmann, M. Hite, P. Hymans, B.J. Isbell, M. Jacobus, K. Jones, M. Katzenstein, C. Lazzaro, T. Loos, K. March, C. A. Martin, S. McConnell-Ginet, K. McCullough, L. Meixner, M. Migiel, M. B. Norton, P. Palmieri, J. Peraino, G. Rendsburg, J. Reppy, M. Rossiter, D. F. Ruggles, N. Russell, S. Samuels, S. Sangren, R. Savin-Williams, L. Schapiro, R. Schneider, D. Schrader, S. Szelenyi, A. M. Smith, M. C. Vallois, A. Villerajo, M. Washington, R. Weil, B. Wejnert, J. Whithing, L. Williams, M. Woods.

Introduction to the Program

Women's Studies is an interdisciplinary program that seeks to deepen understanding of women's lives, culture, and history, in all their complex multiplicities. Transformative as well as additive, women's studies challenges us to re-examine much of what we think we already know by providing an intellectual—and critical—feminist framework through which to view the many interconnections among gender, knowledge, and power. Thus, central to the curriculum in women's studies are such overarching notions as these:

(a) that definitions of gender—including those that privilege exclusive heterosexuality—are not natural or universal but are instead social constructions that vary across time and place, serve political ends, and have ideological underpinnings;

(b) that systems of gender inequality interact with other social inequalities, including those of class, race, ethnicity, sexual preference, and Western vs. non-Western cultures; and

(c) that even the most current knowledge derived from the humanities, social sciences, and natural sciences is not as impartial, objective, or neutral as has traditionally been thought but instead emerges out of particular historical and political contexts.

Although all Women's Studies courses except writing seminars count toward the major, they do not all satisfy distribution requirements or count toward the total hours required in Arts and Sciences; if a course is not cross-listed with another Arts and Sciences department, be sure to check with college offices about whether it will satisfy distribution or our requirements for Arts and Sciences.

Program Offerings

The Women's Studies Program offers an undergraduate major, an undergraduate concentration, and a graduate minor. Undergraduate students in the College of Arts and Sciences who want to major in women's studies can apply directly to the program. Undergraduate students in other colleges at Cornell will need to work out special arrangements and should speak to the Director of Undergraduate Studies (DUS) in Women's Studies.

The Undergraduate Major

The questions posed by feminist inquiry cannot be answered from within any single discipline or even from a simple combination of two or more disciplines. For that reason, the women's studies major provides students with a basic groundwork in the interdisciplinary field of women's studies and then requires each student to construct an advanced and individually tailored program of study on a topic, in a discipline, or in a combination of disciplines of special interest to the student alone.

Rather than specifying a particular sequence of required courses for each and every student, the women's studies major gives students a starting point in women's studies, an active advisory structure to help them shape a curriculum, and an ongoing impetus to reflection about their entire program of undergraduate study.

In designing their major, students should keep in mind that there are comparatively few graduate programs offering a degree in women's studies itself. Accordingly, undergraduates wishing to major in women's studies should talk at length with their faculty adviser about how to design a program of study that will best qualify them for entry into either a job or a postgraduate degree program when they leave Cornell. Undergraduates who might want to do graduate study within a discipline will need to develop a certain level of disciplinary specialization at the undergraduate level. This can be done either by supplementing the women's studies major with a carefully selected cluster of courses in that discipline or by pursuing a double major. Students wishing to apply their interest in Women's Studies to other professional arenas may similarly select focused coursework in their fields or consider supplementing their studies through internships or other work experiences.

Requirements for a Women's Studies Major

1. Prerequisite courses: before applying to the major, the student must complete any two Women's Studies courses with a grade of B- or better. Suggested entry-level courses for 2001–2002 include: any class at the 200 level, especially 210 and 211. These courses would count both as prerequisites and as part of the women's studies major. First-Year writing seminars, in contrast, would count as prerequisite courses but not as part of the major.
2. Required course work:
   a. A minimum of 36 credits in women's studies is required for the major. No course in which the student has earned less than a C- can count toward these 36 credits. Although there is no single women's studies course that is required of all students, every major must complete a program of study that is both graduated in difficulty and interdisciplinary in scope—a program, in other words, that reflects both the breadth and the depth of women's studies scholarship. This program of study should be developed in consultation with the director of undergraduate studies and must include advanced work at the 300 level or above.
   b. Students may count up to three courses outside women's studies toward the major **if** those courses are approved by the director of undergraduate studies as constituting a meaningful component of the student's women's studies curriculum. To facilitate the coordination of a women's studies major with other majors in the college, students may also count toward the major up to three women's studies courses that are simultaneously being counted toward a second major.
3. The Honors Program: to graduate with honors, the major in women's studies must complete a senior thesis under the supervision of a women's studies faculty member and defend that thesis orally before an honors committee. To be eligible for honors, students must have at least a cumulative grade point average of 3.0 in all coursework and a 3.3 average in all courses applying to their women's studies major. Students interested in the Honors Program should consult the Director of Undergraduate Studies (DUS) late in the spring semester of their junior year or very early in the fall semester of their senior year. For more information about the Honors Program, see WOMNS 400 and the "Guidelines For a Senior Honors Thesis" available in the Women's Studies Program office.

The Women's Studies Concentration

Undergraduate students in any college at Cornell can concentrate in Women's Studies in conjunction with a major defined elsewhere in the university. The concentration consists of four courses in Women's Studies completed with a grade of C- or above, no more than two of which can come from a single discipline and none of which should overlap with the major. In rare cases, the DUS may allow one class from within a student's major to count toward the requirements for the concentration. Students should not assume the waiver will be granted, and they must petition the DUS with this request before the beginning of their final semester of study. Freshman writing seminars cannot be included within the four required courses. Students wishing to concentrate in Women's Studies should see the DUS.

The LBG Concentration

Women's Studies serves as home to the Lesbian, Bisexual, and Gay Studies Program, which offers an undergraduate concentration as well as a graduate minor. The LBG undergraduate concentration consists of four courses. The Women's Studies courses that may be used to fulfill the LBG concentration are 210, 244, 262, 277, 285, 321, 353, 355, 376, 377, 413, 415, 427, 433, 450/650, 441/641, 465, 467, 468, 493, 621, 626, 654, 656 and 661. For a complete listing of all courses that will fulfill this concentration please see the LBG Studies portion of this catalog.

I. First-Year Writing Seminars

WOMNS 106 FWS: Women and Writing (also ENGL 105)
Fall and spring. 3 credits. Staff.
For description, see ENGL 105.

WOMNS 114 FWS: Has Breasts, Does Write: Women Writing Women (also THETR 113)
Fall. 3 credits. M. Gualtieri.
For description, see THETR 113.

[WOMNS 178 FWS: Desire (also ENGL 178 and THETR 178)
3 credits. Not offered 2001–2002.
E. Hanson.]

II. Courses

WOMNS 206 Gender and Society (also R SOC 206)
Spring. 3 credits. B. Wejnert.
For description, see R SOC 206.

[WOMNS 210 Introduction to Feminist Theory
4 credits. Not offered 2001–2002.
A. Villarejo.
This course introduces students to critical approaches in feminist scholarship to the cultural, socioeconomic, and political situation(s) of women. Particular attention is paid to the conceptual challenges and dangers posed by attempts to study women without taking account of relations between race, class, and gender in ideological and social formations. Readings draw on work in various disciplines and include literary texts and visual images.]

WOMNS 211 Introduction to Women's Studies (III or IV)
Fall. 3 credits. K. McCollough.
Introduction to Women's Studies is a multidisciplinary approach to understanding the experiences, historical conditions, and concerns of women, both in the present and the past. As the academic manifestation of feminism, women's studies offers a range of perspectives (from liberal to radical) but focuses, in general, on understanding the sources of women's oppression in order to eliminate these sources.

WOMNS 212 African American Women: Twentieth Century (also HIST 212 and AM ST 212)
Spring. 4 credits. M. Washington.
For description, see HIST 212.

[WOMNS 214 Biological Basis of Sex Differences (also BIOAP 214 and B&SOC 214)
3 credits. Not offered 2001–2002.
J. Fortune.]

[WOMNS 234/434 Gender in Early Modern Europe (also HIST 234/434)
4 credits. Not offered 2001–2002. R. Weil.]

[WOMNS 243 Inside-Out: The American Everyday Interior (also DEA 243)
3 credits. Not offered 2001–2002.
J. Jennings.]

[WOMNS 244 Language and Gender Relations (also LING 244)
4 credits. Not offered 2001–2002; next offered fall 2002. S. McConnell-Ginet.]

WOMNS 246 Contemporary Narratives by Latina Writers (also SPANL 246 and LSP 246)
Fall. 3 credits. L. Carrillo.
For description, see SPANL 246.

WOMNS 249 Feminism and Philosophy (also PHIL 249)
Spring. 4 credits. J. Whiting.
For description, see PHIL 249.

WOMNS 251 Twentieth-Century Women Novelists (also ENGL 251)
Spring. 4 credits. S. Samuels.
For description, see ENGL 251.

WOMNS 253 Gender and the Life Course (also HD 253)
Fall. 3 credits. P. Palmieri.
For description, see HD 253.

[WOMNS 273 Women in American Society, Past and Present (also HIST 273)
4 credits. Not offered 2001–2002.
M. B. Norton.]

[WOMNS 277 Social Construction of Gender (also PSYCH 277)
3 credits. Not offered 2001–2002. S. Bem.]

[WOMNS 279 Queer Fiction (also ENGL 278)
4 credits. Not offered 2001–2002.
E. Hanson.]

[WOMNS 280 Lesbian Novel (also ENGL 279)
4 credits. Not offered 2001–2002.
K. McCullough.]

[WOMNS 281 Gender and Society in the Muslim Middle East (also NES 281 and RELST 281)
3 credits. Not offered 2001–2002.
M. Bloom.]

[WOMNS 285 Introduction to Sexual Minorities (also HD 284)
3 credits. Not offered 2001–2002.
R. Savin-Williams.]

[WOMNS 300 Latina Activism and Feminist Theory (also LSP 300)
4 credits. Not offered 2001–2002.
D. Cohen.]

WOMNS 307 African-American Women in Slavery and Freedom (also HIST 303 and AS&RC 307)
Spring. 4 credits. M. Washington.
For description, see HIST 303.

WOMNS 309/509 The Sociology of Marriage (also SOC 309/509)
Fall. 3 credits. M. Clarkberg.
For description, see SOC 309/509.

[WOMNS 314/514 Gender and Work (also SOC 314/514)
4 credits. Not offered 2001–2002.
M. Brinton.]

WOMNS 316 Gender Inequality (also SOC 316)
Fall. 3 credits. S. Szeleyi.
For description, see SOC 316.

WOMNS 319 Seventeenth Century European Women Philosophers (also PHIL 320)
Spring. L. Schapiro.
For description, see PHIL 320.

[WOMNS 320 Queer Theater (also THETR 320)
4 credits. Not offered 2001–2002.
J. E. Gainor.]

WOMNS 321/631 Sex and Gender in Cross-Cultural Perspective (also ANTHR 321/621)
Fall. 4 credits. D. Doukas.
For description, see ANTHR 321/621.

[WOMNS 322 Women in the Hebrew Bible (also NES 320 and JWST 320)
3 credits. Not offered 2001–2002.
G. Rendsburg.]

[WOMNS 326 Women in the Hebrew Bible-Seminar (also NES 326 and JWST 326)
1 credit. Not offered 2001–2002.
G. Rendsburg.]

[WOMNS 327 Shakespeare: Gender and Power (also ENGL 327)
4 credits. Not offered 2001–2002.
B. Correll.]

[WOMNS 348 Studies in Women's Fiction (also ENGL 348)
4 credits. Not offered 2001–2002.
L. Brown.]

[WOMNS 350 Women and Patronage in Islam (also NES 350)
4 credits. Not offered 2001–2002.
D. Ruggles.]

[WOMNS 353 Feminism: State and Public Policy (also GOVT 353)
4 credits. Not offered 2001–2002.
M. Katzenstein.]

[WOMNS 355 Decadence (also ENGL 355 and COM L 355)
4 credits. Not offered 2001–2002.
E. Hanson.]

WOMNS 359 Introduction to Political Feminist Thought (also GOVT 369)
Fall. 4 credits. N. Hirschmann.
For description, see GOVT 369.

WOMNS 361 Impressionism in Society (also ART H 362)
Fall. 4 credits. L. Meixner.
For description, see ART H 362.

WOMNS 366 Women at Work (also IILHR 366)
Spring. 3 or 4 credits. J. Farley.
For description, see ILRHR 366.

[WOMNS 368 Marriage and Sexuality in Medieval Europe (also HIST 368 and RELST)
4 credits. Not offered 2001–2002.
P. Hyams.]

WOMNS 369 Studies in Film Analysis: Fast-Talking Dames and Sad Ladies (also ENGL 369 and THETR 367)
Fall. 3 credits. L. Bogel.
For description, see ENGL 369.

[WOMNS 370 Nineteenth-Century Novel (also ENGL 370)
4 credits. Not offered 2001–2002.
E. Hanson.]

[WOMNS 378 Topics in U.S. Women's History (also HIST 378 and AM ST 378)
4 credits. Not offered 2001–2002.
M. B. Norton.]

[WOMNS 380 Gender, Ideology, and Culture (also SOC 380)
4 credits. Not offered 2001–2002.
P. Becker.]

[WOMNS 384 History of Women and Unions (also ILRCB 384)
4 credits. Not offered 2001–2002.
I. DeVault.]

WOMNS 394 Gender and Sexuality in Early Christianity (also NES 394 and RELST 394)
Spring. 4 credits. K. Haines-Eitzen.
For description, see NES 394.

[WOMNS 396 Introduction to Global Women's Literature (also ENGL 396)
4 credits. Not offered 2001–2002.
E. DeLoughrey.]

WOMNS 400 Senior Honors Thesis
Fall and spring. 2–8 credits. For Women's Studies seniors only. Permission of Women's Studies faculty member required. Student must carry a GPA of 3.0 in all subjects and a 3.3 in Women's Studies. Staff.
Both the form of theses, and the nature and extent of contact between student and adviser, will depend on mutual agreement between the two. In one common scenario, the student will write an essay of approximately 50 pages in length, drafted and revised in a series of carefully planned stages over the course of two semesters, with an outline expected on approximately Sept. 15 and a draft of the first chapter on approximately November 15. An "R" grade will be assigned at the end of the fall semester and a letter grade on completion of the project at the end of the spring semester.

[WOMNS 401 New Women in the 'New' New York (also S HUM 405 and ARCH 690)
4 credits. Not offered 2001–2002.
M. Woods.]

[WOMNS 403 Love, Sex, and Song in the Middle Ages (also MUSIC 403)
4 credits. Not offered 2001–2002.
J. Peraino.]

WOMNS 404 Women Artists (also ART H 466)
Fall. 4 credits. J. Bernstock.
For descreiption, see ART H 466.

WOMNS 405/605 Domestic Television
Spring. 4 credits. A. Villarejo.
This course is a seminar on television as technology and cultural form, focusing on the "domestic" as a synonym for gendered value-coding, an axis of the international division of labor (and questions of television's dissemination and circulation), and a site for historical exploration. The course balances readings in television and cultural theory (Spigel, Dienst, Merck, Williams, Feuer, Modleski, Mellencamp, Shattuc, Spivak, and others) with close analysis of television as information, entertainment, furniture, technology, text, genre, flow, channel, and circuit of production of the commodity audience. Students may enroll in either undergraduate or graduate level with graduate students submitting a longer paper and doing supplementary readings.

[WOMNS 406 The Culture of Lives (also ANTHR 406)
4 credits. Not offered 2001–2002.
K. March.]

[WOMNS 408 Gender Symbolism (also ANTHR 408)
4 credits. Not offered 2001–2002.
K. March.]

[WOMNS 409/609 Misogyny and Its Readers (also ITALL 409/609 and COM L 449/649)
4 credits. Not offered 2001–2002.
M. Migiel.]

[WOMNS 415 Race, Gender, and Organization (also GOVT 415)
4 credits. Not offered 2001–2002.
M. Katzenstein and J. Reppy.]

WOMNS 416 Gender and Sex in South East Asia (also HIST 416)
Spring. 4 credits. T. Loos.
For description, see HIST 416.

[WOMNS 427 Shakespeare: Gender, Sexuality, Cultural Politics (also ENGL 427 and THETR 427) #
4 credits. Not offered 2001–2002.
B. Correll.]

[WOMNS 433 The Female Dramatic Tradition (also THETR 436)
4 credits. Not offered 2001–2002.
J. E. Gainor.]

[WOMNS 438 Female Adolescence in Historical Perspective, 1815–1960 (also HD 417, HIST 458 and AM ST 417)
3 credits. Not offered 2001–2002. J. Brumberg.]

[WOMNS 443 The Novels of George Eliot (also ENGL 444)
4 credits. Not offered 2001–2002. C. Chase.]

WOMNS 444 Historical Issues of Gender and Science (also S&TS 444)
Spring. 4 credits. M. Rossiter.
For description, see S&TS 444.

[WOMNS 446 Women in the Economy (also ILRLE 445 and ECON 457)
4 credits. Not offered 2001–2002. F. Blau.]

[WOMNS 448/648 Boccaccio: Gender, Power, and the Medieval Text (also ITALL 445/645 and COM L 456)
4 credits. Not offered 2001–2002. M. Migiel.]

WOMNS 450/650 Gender and Clinical Psychology (also PSYCH 450/650)
Fall. 4 credits. S. Bem.
For description, see PSYCH 450/650.

WOMNS 451 Women in Italian Renaissance Art (also ART H 450)
Spring. 4 credits. C. Lazzaro.
For description, see ART H 450.

WOMNS 454 Opera, History, Politics, Gender (also HIST 456, S HUM 459, COM L 459, and ITAL 456)
Spring. 4 credits. M. Steinberg, S. Stewart.
For description, see HIST 456.

[WOMNS 463 The Politics of Contemporary Feminist Theory (also GOVT 463)
4 credits. Not offered 2001–2002. N. Hirschmann.]

[WOMNS 464 Gender and Politics in the Roman World (also CLASS 463 and HIST 463)
4 credits. Not offered 2001–2002. J. Ginsburg.]

[WOMNS 465 Feminist Theory/Lesbian Theory (also COM L 465 and GERST 465)
4 credits. Not offered 2001–2002. A. Villarejo.
This seminar explores developments in feminist theory, primarily in the United States from the 1950s through the mid-1990s. We also trace the changing status of "lesbianism" in feminist theories over that same time period and examine its status in current constructions of "queer theory." What happens to the relationship between feminist theory and lesbian thought when "queer theory" emerges? The purpose of the course is to encourage critical, historically informed readings of what could be considered canonical texts and crucial junctures in Second Wave feminist thought, many of which remain unfamiliar even to Women's Studies students.]

[WOMNS 466 Feminism and Gender Discrimination (also GOVT 466 and LAW 648)
4 credits. Not offered 2001–2002. K. Abrams.]

WOMNS 467 Sexual Minorities and Human Development (also HD 464)
Spring. 3 credits. R. Savin-Williams.
For description, see HD 464.

[WOMNS 468 Radical Democratic Feminisms (also GOVT 467)
4 credits. Not offered 2001–2002. A. M. Smith.]

[WOMNS 469/669 Gender and Age in Archeology (also ANTHR 469/669)
4 credits. Not offered 2001–2002. N. Russell.]

[WOMNS 476 Global Women's Literature: (En) Gendering Space (also ENGL 476)
4 credits. Not offered 2001–2002. E. DeLoughrey.]

WOMNS 478 19th Century French Women Writers (also FRLIT 480)
Fall. 4 credits. A. Berger.
For description, see FRLIT 480.

[WOMNS 480 Gender Adjudicated (also HIST 480)
4 credits. Not offered 2001–2002. T. Loos.]

[WOMNS 481 Latin American Women Writers (also SPANL 492 and COM L 482)
4 credits. Not offered 2001–2002. D. Castillo.]

[WOMNS 487 Gender, Nationalism, and Conflict (also GOVT 486)
4 credits. Not offered 2001–2002. M. Katzenstein and M. Evangelista.]

WOMNS 488/688 Beliefs, Attitudes, and Ideologies (also PSYCH 489/689)
Fall. 4 credits. D. Bem.
For description, see PSYCH 489.

[WOMNS 491 Honors Seminar I: Experimental Novels by Women (also ENGL 491)
4 credits. Not offered 2001–2002. M. Hite.]

[WOMNS 493 French Feminisms (also FRLIT 493)
4 credits. Not offered 2001–2002. N. Furman.]

[WOMNS 494 Music and Queer Identity (also MUSIC 492)
4 credits. Not offered 2001–2002. J. Peraino.]

[WOMNS 496 Women and Music (also MUSIC 493)
4 credits. Not offered 2001–2002. J. Peraino.]

WOMNS 499 Directed Study
Fall and spring. Variable credit. Prerequisites: 1 course in women's studies and permission of a faculty member of the Women's Studies Program Board. Staff.

[WOMNS 600 Special Topics in Feminist Theory: An Interdisciplinary Graduate Course in Women's Studies
4 credits. This course is open to graduate students and undergraduate seniors who have obtained permission of instructor. Not offered 2001–2002. Staff.
The purpose of this course is to expose graduate students to interdisciplinary approaches in Women's Studies and feminist theory to a variety of topics or questions. While many of our graduate courses train students in highly specialized areas of feminist theory, this course aims to teach students how to find common intellectual ground around a single topic from interdisciplinary perspectives without sacrificing the complexity of any disciplinary approach. The course is designed for graduate minors in Women's Studies and students with a specialized interest in feminist theory. Although it is not required, the course is strongly recommended for students obtaining a graduate minor in Women's Studies.]

[WOMNS 608 African-American Women (also HIST 608)
4 credits. Not offered 2001–2002. M. Washington.]

[WOMNS 610 Sexuality and the Politics of Representation
4 credits. Not offered 2001–2002. A. Villarejo.
The seminar explores contexts for critical work on sexuality and film/video. Beginning with the texts of Foucault, Freud, Lacan, Jacqueline Rose, and Jeffrey Weeks, the course examines the uses and abuses of psychoanalytic theory, as well as the regulation of sexuality in the past century. "Sexuality" is not, however, a simple abstraction, and its coherence is put to the test through the dual lenses of Marxism and poststructuralism throughout the second half of the course, with readings from Gramsci, Deleuze and Guattari, Lyotard, and others. Films include *Blonde Venus*, *Trash*, *The Night Porter*, *Ali: Fear Eats the Soul*, *Written on the Wind*, and others.]

WOMNS 612 Population and Development in Asia (also R SOC 612)
Spring. 3 credits. L. Williams.
For description, see R SOC 612.

[WOMNS 613 The Political Economy of Gender and Work (also CRP 613)
3 credits. Not offered 2001–2002. L. Beneria.]

[WOMNS 614 Gender and International Development (also CRP 614)
3 credits. Not offered 2001–2002. L. Beneria.]

[WOMNS 618 Feminist Jurisprudence (also LAW 646)
3 credits. Not offered 2001–2002. K. Abrams.]

WOMNS 624 Epistemological Development and Reflective Thought (also EDUC 614)
Fall. 3 credits. D. Schrader.
For description, see EDUC 614.

WOMNS 625 Self and Interpersonal Development (also EDUC 615)
Spring. 4 credits. D. Schrader.
For description, see EDUC 615.

[WOMNS 626 Graduate Seminar in the History of American Women (also HIST 626)
4 credits. Not offered 2001–2002. M. B. Norton.]

[WOMNS 636 Comparative History of Women and Work (also ILRCB 636)
4 credits. Not offered 2001–2002. I. DeVault.]

[WOMNS 638 Contemporary Gender Issues in the Americas (also ANTHR 638)
4 credits. Not offered 2001–2002. B. J. Isbell.]

[WOMNS 644 Topics in the History of Women in Science (also S&TS 644)
4 credits. Not offered 2001–2002. M. Rossiter.]

[WOMNS 654 Queer Theory (also ENGL 654 and COM L 654)
4 credits. Not offered 2001–2002.
E. Hanson.]

[WOMNS 656 Decadence (also ENGL 655 and COM L 655)
4 credits. Not offered 2001–2002.
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[WOMNS 661 Cinematic Desire (also ENGL 660 and AM ST 662)
4 credits. Not offered 2001–2002.
E. Hanson.]

WOMNS 670 Feminist Political Theory (Graduate Seminar) (also GOVT 671)
Fall. 4 credits. N. Hirschmann.
For description, see GOVT 671.

WOMNS 671 Feminist Methods (also R SOC 671)
Fall. 4 credits. S. Feldman.
For description, see R SOC 671.

[WOMNS 692 Hispanic Feminisms (also SPANL 690)
4 credits. Not offered 2001–2002.
D. Castillo.]

WOMNS 699 Topics in Women's Studies
Fall and spring. Variable credits. Staff.
Independent reading course for graduate students on topics not covered in regularly scheduled courses. Students develop a course of readings in consultation with a faculty member in the field of Women's Studies who has agreed to supervise the course work.

[WOMNS 733 Literary Anti-Feminism (also ENGL 733)
4 credits. Not offered 2001–2002.
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Kaske, Carol V., Ph.D., Johns Hopkins U. Prof., English
Katzenstein, Mary F., Ph.D., Massachusetts Inst. of Technology. Prof., Government
Katzenstein, Peter J., Ph.D., Harvard U. Walter S. Carpenter, Jr., Professor of International Studies, Government
Kay, Robert W., Ph.D., Columbia U. Prof., Earth and Atmospheric Sciences/INSTOC#

Kay, Suzanne Mahlburg, Ph.D., Brown U. Assoc. Prof., Earth and Atmospheric Sciences/INSTOC#
Kelley, E. Wood, Ph.D., Indiana U. Assoc. Prof., Government
Kelley, Michael C., Ph.D., U. of California at Berkeley. Prof., Earth and Atmospheric Sciences
Kellock, Judith, M. M., Boston U. Assoc. Prof., Music
Kennedy, William J., Ph.D., Yale U. Prof., Comparative Literature
Kesten, Harry, Ph.D., Cornell U. Prof., Mathematics
Kiefer, Nicholas M., Ph.D., Princeton U. Ta-Chung Liu Prof. of Economics
Kinoshita, Toichiro, Ph.D., Tokyo U. (Japan). Goldwin Smith Professor of Physics Emeritus/LNS¶
Kirkwood, Gordon M., Ph.D., Johns Hopkins U. Frederick J. Whiton Professor of Classics Emeritus
Kirshner, Jonathan, Ph.D., Princeton U. Assoc. Prof., Goverment
Klein, Richard J., Ph.D., Yale U. Prof., Romance Studies
Kleinberg, Jonathan, Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Computer Science
Kline, Ronald, Ph.D., U. of Wisconsin. Assoc. Prof., Science and Technology Studies
Koschmann, J. Victor, Ph.D., U. of Chicago. Prof., History
Kozen, Dexter, Ph.D., Cornell U. Joseph N. Pew Professor of Engineering/Computer Science
Kramnick, Isaac, Ph.D., Harvard U. Richard J. Schwarz Professor of Government
Kronik, John W., Ph.D., U. of Wisconsin. Prof. Emeritus, Romance Studies
Krumhansl, Carol L., Ph.D., Stanford U. Prof., Psychology
Krumhansl, James A., Ph.D., Cornell U. Horace White Professor of Physics Emeritus/LASSP*
Kufner, Herbert L., Ph.D., Cornell U. Prof. Emeritus, Modern Languages and Linguistics
Kuniholm, Peter I., Ph.D., U. of Pennsylvania. Prof., Dendrochronology
LaCapra, Dominick C., Ph.D., Harvard U. Bryce and Edith M. Bowman Professor in Humanistic Studies, History
LaFeber, Walter F., Ph.D., U. of Wisconsin. Marie Underhill Noll Professor of American History, History
Lai, Dong, Ph.D., Cornell U. Asst. Prof., Astronomy/CRSR†
Lambert, Bernd, Ph.D., U. of California at Berkeley. Prof., Anthropology
Lambert, William W., Ph.D., Harvard U. Prof. Emeritus, Psychology/Sociology/Anthropology
Law, Jane Marie, Ph.D., U. of Chicago. Assoc. Prof., Asian Studies/H. Stanley Krusen Professor of World Religions
Lawler, Edward J., Ph.D., U. of Wisconsin. Prof. Sociology/Industrial and Labor Relations
Lawler, Gregory F., Ph.D., Princeton U. Prof., Mathematics
Lawler, Margaret, M. A., San Jose State Coll. Assoc. Prof. Emerita, Theatre Arts
Lazzaro, Claudia, Ph.D., Princeton U. Prof., History of Art
Leavitt, Thomas W., Ph.D., Harvard U. Prof. Emeritus, History of Art
LeClair, André R., Ph.D., Harvard U. Assoc. Prof., Physics/LNS¶
Lee, David M., Ph.D., Yale U. James Gilbert White Distinguished Professor in the Physical Sciences, Physics/LASSP*
Lee, Lee C., Ph.D., Ohio State U. Assoc. Prof. Human Development and Family Studies/ Asian American Studies Program
Lee, Lillian, Ph.D., Harvard U. Asst. Prof., Computer Science
Lee, Stephen, Ph.D., U. of Chicago. Prof., Chemistry and Chemical Biology
Leed, Richard L., Ph.D., Cornell U. Prof. Emeritus, Modern Languages and Linguistics
Lepage, G. Peter, Ph.D., Stanford U. Prof., Physics/LNS¶
Levitsky, David A., Ph.D., Rutgers U. Prof., Nutritional Sciences/Psychology
Levitt, Bruce, Ph.D., U. of Michigan. Prof., Theatre, Film and Dance
Lewis, Philip E., Ph.D, Yale U. Prof., Romance Studies
Littauer, Raphael M., Ph.D., Cambridge U. (England). Prof. Emeritus, Physics/LNS¶
Livesay, G. Roger, Ph.D., U. of Illinois. Prof. Emeritus, Mathematics
Long, Kathleen P., Ph.D., Yale U. Assoc. Prof., Romance Studies
Loos, Tamara L., Ph.D., Cornell U. Asst. Prof., History
Loring, Roger F., Ph.D., Stanford U. Assoc. Prof., Chemistry and Chemical Biology
Lovelace, Richard V. E., Ph.D., Cornell U. Prof., A&EP/Astronomy/CRSR†
Lowi, Theodore J., Ph.D., Yale U. John L. Senior Professor of American Institutions, Government
Lurie, Alison, A. B., Radcliffe Coll. Frederic J. Whiton Professor of American Literature, English
Lynch, Michael, Ph.D. UC Irvine. Prof., Science and Technology Studies
Lyons, Thomas, Ph.D., Cornell U. Prof., Economics
Maas, James B., Ph.D., Cornell U. Prof., Psychology
Macy, Michael W., Ph.D., Harvard U. Prof., Sociology
Majumdar, Mukul K., Ph.D., U. of California at Berkeley. H. T. Warshow and Robert Irving Warshow Professor of Economics
Mankin, David P., Ph.D., U. of Virginia. Assoc. Prof., Classics
March, Kathryn S., Ph.D., Cornell U. Assoc. Prof., Anthropology/Women's Studies
Marcus, Phillip L., Ph.D., Harvard U. Prof. Emeritus, English
Marohn, John, Ph.D., California Institute of Technology. Asst. Prof., Chemistry and Chemical Biology
Martin, Biddy, Ph.D., U. of Wisconsin at Madison. Prof., German Studies/Women's Studies
Masson, Robert T., Ph.D., U. of California at Berkeley. Prof., Economics
Mazrui, Ali A., Ph.D., Oxford U. (England). Senior Scholar, Africana Research and Studies Center and A. D. White Professor-at-Large Emeritus
McCall, Dan E., Ph.D., Columbia U. Prof., English
McClane, Kenneth A., M.F.A., Cornell U. W.E.B. DuBois Professor of Literature, English
McClelland, Peter D., Ph.D., Harvard U. Prof., Economics
McConkey, James R., Ph.D., State U. of Iowa. Prof. Emeritus, English
McConnell-Ginet, Sally, Ph.D., U. of Rochester. Prof., Linguistics
McCoy, William John Jr., Ph.D., Cornell U. Prof. Emeritus, Modern Languages and Linguistics
McCoy, Maureen, M.F.A., U. of Iowa. Assoc. Prof., English
McDaniel, Boyce D., Ph.D., Cornell U. Floyd R. Newman Professor of Nuclear Studies Emeritus, Physics/LNS¶
McDermott, Rose, Ph.D., Stanford U. Asst. Prof., Government
McEuen, Paul L., Ph.D. Yale U. Prof., Physics, Physics/LASSP
McGowan, Kaja, Ph.D., Cornell U. Asst. Prof., History of Art
MacDonald, Scott, Ph.D., Cornell U. Prof., Philosophy
McGinnis, Robert, Ph.D., Northwestern U. Prof. Emeritus, Sociology
McLafferty, Fred W., Ph.D., Cornell U. Peter J. W. Debye Emeritus Professor of Chemistry and Chemical Biology
McMillin, H. Scott, Ph.D., Stanford U. Prof., English
McMurry, John E., Ph.D., Columbia U. Prof., Chemistry and Chemical Biology
McNeal, Robin, Ph.D., U. of Washington. Asst. Prof., Asian Studies
McNulty, Tracy, Ph.D., U. of California at Irvine. Asst. Prof., Romance Studies
McQuade, D. Tyler, Ph.D., U. of Wisconsin. Asst. Prof., Chemistry and Chemical Biology
Mebane, Walter, Ph.D., Yale U. Assoc. Prof., Government
Mei, Tsu-Lin, Ph.D., Yale U. Hu Shih Prof. Emeritus of Chinese Literature and Philology, Asian Studies
Meinwald, Jerrold, Ph.D., Harvard U. Goldwin Smith Professor of Chemistry and Chemical Biology
Meixner, Laura L., Ph.D., Ohio State U. Assoc. Prof., History of Art
Melas, Natalie A., Ph.D., U. of California at Berkeley. Assoc. Prof., Comparative Literature
Mermin, Dorothy M., Ph.D., Harvard U. Goldwin Smith Professor of English
Mermin, N. David, Ph.D., Harvard U. Horace White Professor of Physics, Physics/LASSP*
Messing, Gordon M., Ph.D., Harvard U. Prof. Emeritus, Classics
Mialet, Helene, Ph.D., U. of Paris. Asst. Prof., Science and Technology Studies
Migiel, Marilyn, Ph.D., Yale U. Assoc. Prof., Romance Studies
Miller, Richard W., Ph.D., Harvard U. Prof., Philosophy/Science and Technology Studies
Milles, Beth F., M.A., Harvard U. Asst. Prof., Theatre, Film and Dance
Minkowski, Christopher, Ph.D., Harvard U. Assoc. Prof., Asian Studies
Mitra, Tapan, Ph.D., U. of Rochester. Prof., Economics
Moen, Phyllis, Ph.D, U. of Minnesota. Prof., Human Ecology/Sociology
Mohanty, Satya P., Ph.D., U. of Illinois. Assoc. Prof., English
Monosoff-Pancaldo, Sonya, Artists Diploma, Juilliard School of Music. Prof. Emeritus, Music
Monroe, Jonathan B., Ph.D., U. of Oregon. Prof., Comparative Literature
Moody-Adams, Michele, Ph.D., Harvard U. Wyn and William Y. Hutchinson Prof. of Ethics and Public Life/Prof., Philosophy
Moore, R. Laurence, Ph.D., Yale U. Howard A. Newman Professor in American Studies, History
Morgan, Robert R., M.F.A., U. of North Carolina. Kappa Alpha Prof. of English
Morgan, Stephen L., Ph.D., Harvard U. Asst. Prof., Sociology
Morgenroth, Joyce, M.A., Johns Hopkins U. Assoc. Prof., Theatre, Film and Dance
Morley, Michael D., Ph.D., U. of Chicago. Prof., Mathematics
Morrisett, Greg, Ph.D., Carnegie Mellon U. Assoc. Prof., Computer Science
Morrison, George H., Ph.D, Princeton U. Prof. Emeritus, Chemistry and Chemical Biology
Munasinghe, Viranjini P., Ph.D., Johns Hopkins U. Assoc. Prof., Anthropology/ Asian American Studies
Murray, Timothy, Ph.D., Johns Hopkins U. Prof., English
Myers, Andrew, Ph.D., Massachusetts Institute of Technology. Asst. Prof., Computer Science

Najemy, John M., Ph.D., Harvard U. Prof., History
Nee, Victor, Ph.D., Harvard U. Goldwin Smith Professor of Sociology
Neisser, Ulric, Ph.D., Harvard U. Prof., Psychology
Nelson, Frederick E., Ph.D., U. of Michigan. Assoc. Prof., Geological Sciences
Nerode, Anil, Ph.D., U. of Chicago. Goldwin Smith Professor of Mathematics
Neubert, Matthias, Ph.D., Ruprecht-Karls-U. of Heidelberg. Prof., Physics/LNS¶
Neuhouser, Frederick, Ph.D., Columbia U. Assoc. Prof., Philosophy
Ngaté, Jonathan, Ph.D., U. of Washington. Assoc. Prof., Romance Studies
Nicholson, Philip, Ph.D., California Inst. of Technology. Prof., Astronomy/CRSR†
Norton, Mary Beth, Ph.D., Harvard U. Mary Donlon Alger Professor of American History, History
Nussbaum, Alan, Ph.D., Harvard U. Prof., Classics/Linguistics
Nussbaum, Michael, Dr. Sci., Academy of Sciences Berlin (Germany). Prof., Mathematics
O'Connor, Stanley J., Ph.D., Cornell U. Prof. Emeritus, History of Art
O'Donoghue, Ted, Ph.D., U. of California at Berkeley. Asst. Prof., Economics
O'Neill, Kathleen, Ph.D., Harvard U. Asst. Prof., Government
Ohadike, Don, Ph.D., U. of Jos (Nigeria). Assoc. Prof., Africana Studies and Research Center
Oliver, Jack E., Ph.D., Columbia U. Irving Porter Church Professor Emeritus of Engineering/Earth and Atmospheric Sciences/INSTOC#
Orear, Jay, Ph.D., U. of Chicago. Prof. Emeritus, Physics/LNS¶
Ortigueira, Salvador, Ph.D., U. Carlos III (Madrid) Asst. Prof.. Economics
Owen, David I., Ph.D., Brandeis U. Bernard and Jane Schapiro Professor of Ancient Near Eastern and Judaic Studies, Near Eastern Studies
Owren, Michael J., Ph.D., Indiana U. Asst. Prof., Psychology
Palmer, Robert M., M.M., Eastman School of Music. Given Foundation Professor of Music Composition Emeritus, Music
Pan, An-yi, Ph.D., U. of Kansas. Asst. Prof., History of Art
Park, Kichool, Ph.D., U. of California at Los Angeles. Asst. Prof., Economics
Parker, A. Reeve, Ph.D., Harvard U. Prof., English
Parpia, Jeevak M., Ph.D., Cornell U. Prof., Physics/LASSP*
Parrish, Stephen M., Ph.D., Harvard U. Goldwin Smith Professor of English Emeritus
Patterson, J. Ritchie, Ph.D., U. of Chicago. Assoc. Prof., Physics/LNS¶
Payne, Lawrence E., Ph.D., Iowa State U. Prof. Emeritus, Mathematics
Paz-Soldán, José E., Ph.D., U. of California at Berkeley. Asst. Prof., Romance Studies
Peeva, Irena, Ph.D., Brandeis U. Asst. Prof., Mathematics
Pelliccia, Hayden, Ph.D., Yale U. Assoc. Prof., Classics
Peraino, Judith A., Ph.D., U. of California at Berkeley. Asst. Prof., Music
Peterson, Charles A., Ph.D., U. of Washington. Prof., History
Piedra, José, Ph.D., Yale U. Assoc. Prof., Romance Studies
Piggott, Joan R., Ph.D., Stanford University. Assoc. Prof., History
Pinch, Trevor J., Ph.D., U. of Bath (England). Prof., Science and Technology Studies
Pingali, Keshav K., Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Computer Science
Pintner, Walter M., Ph.D., Harvard U. Prof. Emeritus, History
Plane, Robert A., Ph.D., U. of Chicago. Prof. Emeritus, Chemistry
Platek, Richard, Ph.D., Stanford U. Assoc. Prof., Mathematics
Pohl, Robert O., Doktor, U. Erlangen (Germany). Prof. Emeritus, Physics/LASSP*
Pohl, Susanne, Ph.D., U. of Michigan. Asst. Prof., History
Polenberg, Richard, Ph.D., Columbia U. Goldwin Smith Professor of American History, History
Pollak, Nancy, Ph.D., Yale U. Assoc. Prof., Russian Literature
Pond, Steven, Ph.D., U. of California at Berkeley. Asst. Prof., Music
Pontusson, Jonas, Ph.D., U. of California at Berkeley. Assoc. Prof., Government
Porte, Joel, Ph.D., Harvard U. Ernest I. White Professor of American Studies and Humane Letters, English
Possen, Uri M., Ph.D., Yale U. Prof., Economics
Power, Alison G., Ph.D., U. of Washington. Prof., Science and Technology Studies/ Ecology and Systematics
Powers, David S., Ph.D., Princeton U. Prof., Near Eastern Studies
Provine, William B., Ph.D., U. of Chicago. Prof., History/Biological Sciences
Pucci, Pietro, Ph.D., U. of Pisa (Italy). Goldwin Smith Professor of Classics
Rabkin, Jeremy A., Ph.D., Harvard U. Assoc. Prof., Government
Radzinowicz, Mary A., Ph.D., Columbia U. Jacob Gould Schurman Professor of English Emerita
Ralph, Daniel C., Ph.D., Cornell U. Assoc. Prof., Physics/LASSP*
Ramage, Andrew, Ph.D., Harvard U. Prof., History of Art
Ramakrishna, Ravi, Ph.D., Princeton U. Asst. Prof., Mathematics
Rawlings III, Hunter R., Ph.D., Princeton U. Prof., Classics
Razin, Assaf, Ph.D., U. of Chicago. Friedman Professor of International Economics
Regan, Dennis T., Ph.D., Stanford U. Assoc. Prof., Psychology
Regan, Elizabeth Adkins, Ph.D., U. of Pennsylvania. Prof., Psychology/Biological Sciences
Rendsburg, Gary, Ph.D., New York U. Paul and Berthe Hendrix Memorial Professor of Jewish Studies, Near Eastern Studies
Reppy, John D., Ph.D., Yale U. John L. Wetherill Professor of Physics Emeritus, Physics/LASSP*
Reppy, Judith, Ph.D. Cornell U. Prof., Science and Technology Studies
Resina, Joan Ramon, Ph.D., U. of California at Berkeley. Prof., Romance Studies
Rhodes, Frank H. T., Ph.D. , U. of Birmingham (England). Prof., Earth and Atmospheric Sciences
Richards, Annette, Ph.D., Stanford U. Assoc. Prof., Music
Richardson, Robert C., Ph.D., Duke U. F. R. Newman Professor of Physics/LASSP*
Rife, Joseph L., Ph.D., U. of Michigan. Townsend Asst. Prof., Classics
Riha, Susan J., Ph.D., Washington State U. Prof., Earth and Atmospheric Sciences
Rogers, Joseph T., Ph.D., U. of Rochester. Assoc. Prof., Physics/LNS¶
Roldan, Mary J., Ph.D., Harvard U. Assoc. Prof., History
Rooth, Mats, Ph.D., U. of Massachusetts at Amherst. Prof., Linguistics
Rosen, Bernard C., Ph.D., Cornell U. Prof. Emeritus, Sociology
Rosen, Carol G., Ph.D., Harvard U. Prof., Linguistics
Rosen, David, Ph.D., U. of California at Berkeley. Prof., Music
Rosenberg, Alex, Ph.D., U. of Chicago. Prof. Emeritus, Mathematics
Rosenberg, Edgar, Ph.D., Stanford U. Prof., English/Comparative Literature
Rossiter, Margaret, Ph.D., Yale U. Marie Underhill Noll Professor of the History of Science, Science and Technology Studies
Rothaus, Oscar S., Ph.D., Princeton U. Prof., Mathematics
Rubin, David L., Ph.D., U. of Michigan. Boyce D. McDaniel Prof. of Physics, Physics/LNS¶
Rush, Myron, Ph.D., U. of Chicago. Prof., Government
Russell, Nerissa, Ph.D., U. of California at Berkeley. Asst. Prof., Anthopology
Rusten, Jeffrey S., Ph.D., Harvard U. Prof., Classics
Ryter, Loren, Ph.D., U. of Washington. Asst. Prof., Government
Saccamano, Neil, Ph.D., Johns Hopkins U. Assoc. Prof., English/Comparative Literature
Sakai, Naoki, Ph.D., U. of Chicago. Prof., Asian Studies/Comparative Literature
Saloff-Coste, Laurent, Ph.D., U. Paris VI. Prof., Mathematics
Salpeter, Edwin E., Ph.D., Birmingham U. (England). James Gilbert White Distinguished Professor in the Physical Sciences Emeritus, Physics/LNS¶/Astronomy/CRSR†
Salvatore, Nicholas, Ph.D., U. of California at Berkeley. Prof., Industrial and Labor Relations/American Studies
Samuels, Shirley, Ph.D., U. of California at Berkeley. Prof., English
Sanders, Elizabeth, Ph.D., Cornell U. Prof., Government
Sangren, P. Steven, Ph.D., Stanford U. Prof., Anthropology
Santiago-Irizarry, Vilma, Ph.D., New York U. Asst. Prof., Anthropology and Latino Studies
Sawyer, Paul L., Ph.D., Columbia U. Prof., English
Scatterday, Mark Davis, D.M.A., Eastman School of Music. Prof., Music
Schamis, Hector, Ph.D., Columbia U. Asst. Prof., Government
Schatz, Alfred H., Ph.D., New York U. Prof., Mathematics
Scheraga, Harold A., Ph.D., Duke U. George W. and Grace L. Todd Professor Emeritus of Chemistry and Chemical Biology
Schneider, Fred B., Ph.D., SUNY at Stonybrook. Prof., Computer Science
Schneider, Rebecca, Ph.D., New York U. Asst. Prof., Theatre, Film and Dance
Schuler, Richard E., Ph.D., Brown U. Prof., Economics/Engineering
Schwartz, David, Ph.D., SUNY at Buffalo. Asst. Prof., Computer Science
Schwarz, Anette, Ph.D., Johns Hopkins U. Assoc. Prof., German Studies
Schwarz, Daniel R., Ph.D., Brown U. Prof., English
Selman, Bart, Ph.D., U. of Toronto. Assoc. Prof., Computer Science
Seltzer, Mark, Ph.D., U. of California at Berkeley. Prof., English
Sen, Shankar, Ph.D., Harvard U. Prof., Mathematics
Senderovich, Savely, Ph.D., New York U. Prof., Russian Literature
Sethna, James P., Ph.D., Princeton U. Prof., Physics/LASSP*
Seznec, Alain, D.E.S., U. of Paris-Sorbonne (France). Prof. Emeritus, Romance Studies
Shanzer, Danuta, D.Phil., Oxford U. (England). Prof., Classics
Shapiro, Gavriel, Ph.D., U. of Illinois at Urbana. Assoc. Prof., Russian Literature
Shaw, Harry E., Ph.D., U. of California at Berkeley. Prof., English
Shefter, Martin A., Ph.D., Harvard U. Prof., Government

Shell, Karl, Ph.D. Stanford U. Robert Julius Thorne Professor of Economics
Shepherd, Reginald, MFA., U. of Iowa. Asst. Prof., English
Shin, Michael, Ph.D., U. of Chicago. Instructor, Asian Studies
Shirai, Yasuhiro, Ph.D., U. of California at Los Angeles. Assoc. Prof., Asian Studies
Shmoys, David B., Ph.D., U. of California at Berkeley. Prof., Computer Science
Shoemaker, Sydney S., Ph.D., Cornell U. Susan Linn Sage Professor of Philosophy
Shore, Richard A., Ph.D., Massachusetts Inst. of Technology. Prof., Mathematics
Shue, Henry, Ph.D., Princeton U. Wyn and William Y. Hutchinson Prof. of Ethics and Public Life
Shue, Vivienne B., Ph.D., Harvard U. Frank and Rosa Rhodes Professor of Chinese Government
Siegel, James T., Ph.D., U. of California at Berkeley. Prof., Anthropology
Siegel, Sandra F., Ph.D., U. of Chicago. Prof., English
Sierra, Roberto, M. M., London U. (England). Prof., Music
Sievers, Albert J. III, Ph.D., U. of California at Berkeley. Edward L. Nichols Professor, Physics/LASSP*
Silbey, Joel H., Ph.D., U. of Iowa. President White Professor of History, History
Silsbee, Robert H., Ph.D., Harvard U. Prof. Emeritus, Physics/ LASSP*
Silverman, Albert, Ph.D., U. of California at Berkeley. Prof. Emeritus, Physics/LNS¶
Sirer, Emin Gun, Ph.D., U. of Washington. Asst. Prof., Computer Science
Sjamaar, Reyer, Ph.D., Rijksuniversiteit te Utrecht (The Netherlands). Asst. Prof., Mathematics
Small, Meredith F., Ph.D., U. of California at Davis. Asst. Prof., Anthropology
Smillie, John, Ph.D., U. of Chicago. Prof., Mathematics
Smith, Anna Marie, Ph.D., U. of Essex (England). Assoc. Prof., Government
Smith, Robert J., Ph.D., Cornell U. Goldwin Smith Professor of Anthropology Emeritus
Sogah, Dotsevi Y., Ph.D., U. of California at Los Angeles. Prof., Chemistry and Chemical Biology
Sokol, Thomas A., M.A., George Peabody Coll. Prof. Emeritus, Music
Solà, Donald F., Ph.D., Cornell U. Prof. Emeritus, Modern Languages and Linguistics
Somkin, Fred, Ph.D., Cornell U. Prof. Emeritus, History
Speh, Birgit, Ph.D., Massachusetts Inst. of Technology. Prof., Mathematics
Spillers, Hortense, Ph.D., Brandeis U. Frederick J. Whiton Prof. of English
Spivey-Knowlton, Michael, Ph.D., U. of Rochester. Asst. Prof., Psychology
Squyres, Steven W., Ph.D., Cornell U. Prof., Astronomy/CRSR†
Stacey, Gordon J., Ph.D., Cornell U. Assoc. Prof., Astronomy/CRSR†
Staller, George J., Ph.D., Cornell U. Prof., Economics
Stanley, Jason, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Philosophy
Starr, Deborah A., Ph.D., U. of Michigan. Asst. Prof., Near Eastern Studies
Stein, Peter C., Ph.D., Massachusetts Inst. of Technology. Prof., Physics/LNS¶
Steinberg, Michael P., Ph.D. , U. of Chicago. Prof., History
Stern, Robert, Ph.D., Vanderbilt U. Prof., Sociology/Industrial and Labor Relations
Stillman, Michael E., Ph.D., Harvard U. Assoc. Prof., Mathematics
Stith, Marice W., M.A., Ohio State U. Prof., Emeritus, Music
Strang, David, Ph.D., Stanford U. Assoc. Prof., Sociology
Strauss, Barry S., Ph.D., Yale U. Prof., History/ Classics
Strichartz, Robert S., Ph.D., Princeton U. Prof., Mathematics
Strout, S. Cushing, Jr., Ph.D., Harvard U. Ernest I. White Professor of American Studies and Humane Letters, Emeritus, English
Stucky, Steven, D.M.A., Cornell U. Prof., Music
Sturgeon, Nicholas L., Ph.D., Princeton U. Prof., Philosophy
Stycos, Joseph M., Ph.D., Columbia U. Prof., Rural Sociology/Sociology
Subramanian, Shankar, Ph.D., U. of California at Berkeley. Asst. Prof., Economics
Suh, Jae Jung, Ph.D., U. of Pennsylvania. Asst. Prof., Government
Suñer, Margarita A., Ph.D., Indiana U. Prof., Linguistics
Sweedler, Moss E., Ph.D., Massachusetts Inst. of Technology. Prof. Emeritus, Mathematics
Szabó, Zoltán, Ph.D., Massachusetts Inst. of Technology. Asst. Prof., Philosophy
Szelényi, Szonja, Ph.D., U. of Wisconsin. Assoc. Prof., Sociology
Tagliacozzo, Eric, Ph.D., Yale U. Asst. Prof., History
Talman, Richard M., Ph.D., California Inst. of Technology. Prof., Physics/LNS¶
Tan, Kia-Hui, D.M.A., Cleveland Institute of Music. Asst. Prof., Music
Tardos, Eva, Ph.D., Eötvös U. (Hungary). Prof., Computer Science
Tarrow, Sidney G., Ph.D., U. of California at Berkeley. Maxwell M. Upson Professor of Government
Taylor, Keith W., Ph.D., U. of Michigan. Prof., Asian Studies
Teitelbaum, Tim, Ph.D., Carnegie-Mellon U. Assoc. Prof., Computer Science
Terzian, Yervant, Ph.D., Indiana U. David C. Duncan Professor in the Physical Sciences, Astronomy/NAIC‡
Teskey, Gordon L., Ph.D., U. of Toronto, Canada. Prof., English
Teukolsky, Saul A., Ph.D., California Inst. of Technology. Hans A. Bethe Professor of Physics and Astronomy, Physics/LNS¶/ Astronomy
Thorbecke, Erik, Ph.D., U. of California at Berkeley. H. Edward Babcock Professor of Economics and Food Economics Emeritus, Nutritional Sciences/Economics
Thorne, Robert E., Ph.D., U. of Illinois. Assoc. Prof., Physics/LASSP*
Tierney, Brian, Ph.D., Pembroke College of Cambridge U. (England). Bryce and Edith M. Bowman Professor in Humanistic Studies Emeritus, History
Tigner, Maury, Ph.D., Cornell U. Hans Bethe Prof. of Physics, Emeritus, Physics/LNS¶
Tolbert, Pamela, Ph.D., U. of California at Los Angeles Assoc. Prof., Sociology/Industrial and Labor Relations
Toorawa, Shawkat, Ph.D., U. of Pennsylvania. Asst. Prof., Near Eastern Studies
Toueg, Sam, Ph.D., Princeton. Prof., Computer Science
Tucker, Scott, M.M., New England Conservatory. Assoc. Prof., Music
Turcotte, Donald L., Ph.D., California Inst. of Technology. Maxwell M. Upson Professor of Engineering, Earth and Atmospheric Sciences/INSTOC#
Turner, James E., Ph.D., Union Graduate School at Antioch College. Prof., Africana Studies and Research Center
Turner, Terrence, Ph.D., Harvard U. Prof., Anthropology
Tye, Sze-hoi Henry, Ph.D., Massachusetts Inst. of Technology. Prof., Physics/LNS¶
Uphoff, Norman T., Ph.D., U. of California at Berkeley. Prof., Government
Urquiola, Miguel, Ph.D., U. of California at Berkeley. Asst. Prof., Economics
Usher, David A., Ph.D., Cambridge U. (England). Assoc. Prof., Chemistry and Chemical Biology
Usner, Daniel H., Jr., Ph D., Duke U. Prof., History
Vallois, Marie-Claire, Ph.D., U. of Nice (France). Assoc. Prof., Romance Studies
Vanek, Jaroslav, Ph.D., Massachusetts Inst. of Technology. Carl Marks Professor of International Studies Emeritus, Economics
Van Coetsem, Frans, Ph.D., U. of Leuven (Belgium). Prof. Emeritus, Modern Languages and Linguistics
Van Loan, Charles F., Ph.D., U. of Michigan. Prof., Computer Science
Vaughn, Stephanie, M.F.A., U. of Iowa. Prof. Emeritus, English
Vavasis, Stephen, Ph.D., Stanford U. Assoc. Prof., Computer Science
Veverka, Joseph F., Ph.D., Harvard U. Prof., Astronomy/CRSR†
Villarejo, Amy, Ph.D., U. of Pittsburgh. Asst. Prof., Theatre, Film and Dance/Women's Studies
Viramontes, Helena M., M.F.A., U. of California at Irvine. Asst. Prof., English
Vogelsang, Tim, Ph.D., Princeton U. Assoc. Prof. Economics
Vogtmann, Karen L., Ph.D., U. of California at Berkeley. Prof., Mathematics
Volman, Thomas P., Ph.D., U. of Chicago. Assoc. Prof., Anthropology
Wahlbin, Lars B., Ph.D., U. of Göteborg (Sweden). Prof., Mathematics
Waite, Geoffrey C. W., Ph.D., Princeton U. Assoc. Prof., German Studies
Wan, Henry Y., Jr., Ph.D., Massachusetts Inst. of Technology. Prof., Economics
Wang, Michelle D., Ph.D., U. of Michigan. Asst. Prof., Physics/LASSP*
Warner, Ding Xiang, Ph.D., U. of Washington. Asst. Prof, Asian Studies
Washington, Margaret, Ph.D., U. of California at Davis. Assoc. Prof., History
Wasserman, Ira M., Ph.D., Harvard U. Prof., Astronomy/Physics/CRSR†
Waugh, Linda R., Ph.D., Indiana U. Prof. Emeritus, Romance Studies/Comparative Literature
Way, Christopher, Ph.D., Stanford U. Asst. Prof., Government
Webster, James, Ph.D., Princeton U. Goldwin Smith Professor of Music
Weeden, Kim, Ph.D., Stanford U. Asst. Prof., Sociology
Weil, Rachel, Ph.D., Princeton U. Assoc. Prof., History
Weiss, John H., Ph.D., Harvard U. Assoc. Prof., History
Weiss, Michael, Ph.D., Cornell U. Assoc. Prof., Linguistics
Wen, Yi, Ph.D., U. of Iowa. Asst. Prof., Economics
West, James E., Ph.D., Louisiana State U. Prof., Mathematics
Wetherbee, Winthrop, Ph.D., U. of California at Berkeley. Avalon Professor of English and Medieval Studies, English/Medieval Studies/Comparative Literature
Wetherington, Elaine, Ph.D., U. of Michigan. Assoc. Prof., Sociology/Human Development
White, William M., Ph.D., U. of Rhode Island. Prof., Earth and Atmospheric Sciences
Whiting, Jennifer, Ph.D., Cornell U. Assoc. Prof., Philosophy
Whitman, John B., Ph.D., Harvard U. Assoc. Prof., Linguistics
Widom, Benjamin, Ph.D., Cornell U. Goldwin Smith Professor of Chemistry and Chemical Biology
Wilcox, Charles F., Jr., Ph.D., U. of California at Los Angeles. Prof., Chemistry and Chemical Biology
Wilks, Daniel S., Ph.D., Oregon State U. Prof., Earth and Atmospheric Sciences

Willford, Andrew C., Ph.D., U. of California at San Diego. Asst. Prof., Anthropology
Williams, L. Pearce, Ph.D., Cornell U. John Stambaugh Professor of the History of Science Emeritus, Science and Technology Studies
Williams, Robin M., Jr., Ph.D., Harvard U. Henry Scarborough Professor of Social Sciences Emeritus, Sociology
Wilson, Robert R., Ph.D. , U. of California at Berkeley. Prof. Emeritus, Physics
Wolczanski, Peter T., Ph.D., California Inst. of Technology. George W. and Grace L. Todd Professor of Chemistry and Chemical Biology
Wolff, John U., Ph.D., Yale U. Prof., Linguistics/Asian Studies
Wong, Shelley, Ph.D., U. of California at Berkeley. Assoc. Prof., English/Asian American Studies
Wyatt, David K., Ph.D., Cornell U. John Stambaugh Professor of History, History
Yan, Tung-Mow, Ph.D., Harvard U. Prof., Physics/LNS¶
Yearsley, David G., Ph.D., Stanford U. Asst. Prof., Music
Yona, Golan, Ph.D., Hebrew U. Asst. Prof., Computer Science
Zabih, Raman, Ph.D., Stanford U. Assoc. Prof., Computer Science
Zaslaw, Neal A., Ph.D., Columbia U. Herbert Gussman Professor of Music
Zax, David B., Ph.D., U. of California at Berkeley. Assoc. Prof., Chemistry and Chemical Biology
Zec, Draga, Ph.D., Stanford U. Assoc. Prof., Linguistics

*Laboratory of Atomic and Solid State Physics.
†Center for Radiophysics and Space Research.
‡National Astronomy and Ionosphere Center.
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